HANDWASHING PRACTICES AMONG HOSPITAL PATIENTS: KNOWLEDGE AND PERCEPTIONS OF AMBULATORY PATIENTS AND NURSING PERSONNEL

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science

By

MARY JO DISTEL
B.S.N., University of Florida, 1973

1989
Wright State University

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION: UNCLASSIFIED	1b. RESTRICTIVE MARKINGS: NONE
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S): AFIT/CI/CIA- 89-040
6a. NAME OF PERFORMING ORGANIZATION: AFIT STUDENT AT WRIGHT STATE UNIVERSITY / 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION: AFIT/CIA
6c. ADDRESS (City, State, and ZIP Code)	7b. ADDRESS (City, State, and ZIP Code): Wright-Patterson AFB OH 45433-6583
8a. NAME OF FUNDING/SPONSORING ORGANIZATION / 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification) (UNCLASSIFIED)
Handwashing Practices Among Hospital Patients: Knowledge and Perceptions of Ambulatory Patients and Nursing Personnel

12. PERSONAL AUTHOR(S)
Mary Jo Distel

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
THESIS/~~DISSERTATION~~	FROM _____ TO _____	1989	172

16. SUPPLEMENTARY NOTATION
APPROVED FOR PUBLIC RELEASE IAW AFR 190-1
ERNEST A. HAYGOOD, 1st Lt, USAF
Executive Officer, Civilian Institution Programs

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

90 02 01 007

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION: UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL: ERNEST A. HAYGOOD, 1st Lt, USAF	22b. TELEPHONE (Include Area Code): (513) 255-2259 / 22c. OFFICE SYMBOL: AFIT/CI

DD Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE

AFIT/CI "OVERPRINT"

WRIGHT STATE UNIVERSITY

SCHOOL OF GRADUATE STUDIES

March 1, 1989

I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY Mary Jo Distel ENTITLED Handwashing Practices Among Hospital Patients: Knowledge and Perceptions of Ambulatory Patients and Nursing Personnel BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE .

Donna Deane
Thesis Director

Jeanette Lancaster
Chairman of Department

Committee on
Final Examination

Patricia A. Martin

David L. Taylor

Donald C. Thomas
Dean of the School of Graduate Studies

ABSTRACT

Distel, Mary Jo. M.S., School of Nursing, Wright State University, 1989. Handwashing Practices Among Hospital Patients: Knowledge and Perceptions of Ambulatory Hospital Patients and Nursing Personnel.

To generate information specific to patient handwashing practices, a descriptive study was accomplished at two levels. Field observations were conducted to assess actual handwashing behaviors demonstrated by ambulatory hospital patients. Surveys were administered to the same patients and their nursing personnel to assess each group's knowledge level and perceptions about patient handwashing.

The study consisted of 40 adult patients (20 on a medical unit and 20 on a surgery unit), and nursing personnel (22 registered nurses and 13 military medical technicians) who provided nursing care to those patients. The study asked and attempted to answer seven research questions.

The study uncovered a paradox between knowledge and perceptions about patient handwashing held by the study participants and actual patient handwashing practices. Although patients and their nursing personnel held similarly high levels of knowledge and positive perceptions

about the importance of handwashing to infection control, patient handwashing was demonstrated poorly in actual practice (22% of the times it was indicated). Nursing personnel indicated that patient handwashing is a neglected practice in hospitals. The same personnel added that reminding patients to wash their hands is clearly a nursing responsibility; patients thought that nursing personnel were too busy to do so.

Current handwashing theories fail to show the significance of patient handwashing to the control of infections in hospitals. By incorporating patient handwashing into a conceptual model, health care workers can better appreciate that patient handwashing is essential but largely absent from current practice. These study findings can serve as a reminder that the importance of patient handwashing should be stressed in all patient care settings. Through careful assessment of patient handwashing behaviors and future education of the impact of handwashing on infection control, patients and nursing personnel can work together to improve the quantity and quality of handwashing in hospitals.

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ACKNOWLEDGEMENTS

As I complete this phase of my graduate education, I look back and reflect on the events and persons that helped me meet my goals. There are so many people who have given me encouragement and support in my career and personal life, it seems appropriate to recognize some of them in writing here.

First, let me thank my thesis committee: Donna Deane, chairperson, Patricia Martin and David Taylor. Thanks to you all for your guidance, support, encouragement and constructive criticisms. You all have been excellent role models as educators, researchers, authors and professionals. I have enjoyed learning from you and becoming a colleague.

A simple thanks does not seem worthy of the gratitude my family deserves. To my parents, Howard and Beverly Hawkins, I thank you for the never-ending faith and guidance you have shown me, and for always being with me in spirit. Your love can never be replaced.

To my husband, Tom, I give my deepest gratitude and love. Without your undying support, I would have never personally realized the potential we all have to be our very best, to reach whatever goal we set, if we would only dare to try. Thanks too, for carrying more than your fair share in our relationship as life long partners and parents as I secluded myself to read, write and study in an effort to

reach the goals I set and we met together. Thanks to my children, Tina and Timmy, who constantly surprise me and make me smile when I need it most.

To my mentor and dear friend, Jane Bigelow, without your professional guidance, persistence and belief in my potential, this dream would have never become a reality. You persuaded me to do what I thought was impossible. Thanks for encouraging me to grow.

To my new friend, Robin Bashore, I extend my gratitude. Your comradery meant alot to me as I struggled to renew study habits that were long buried. Without your help, encouragement, and laughter, many aspects of graduate school would have been unbearable. Thanks for sharing the good times and the bad, and thanks for simply being my friend.

Thank you to all of the nursing personnel and patients who participated in this study and have helped to extend the body of knowledge regarding patient handwashing practices. Perhaps tomorrow's patients and health care workers will benefit from your participation.

My acknowledgements would be incomplete if I failed to mention the U.S. Air Force, especially the Nurse Corps. Thank you for funding my graduate education and for permitting me the time away from work so I could concentrate on my studies. Without the support of everyone in the organization, my post-graduate endeavors would have been much more difficult to complete. Thanks again!

DEDICATION

This work is dedicated to my mother, Beverly Hawkins, who taught me the importance of handwashing when I was a child; and to my children, Tina and Timmy, who constantly require gentle reminders to wash their hands. To all of you, this manuscript is written with love.

CHAPTER 1: INTRODUCTION

Introduction

Thirty years ago, the American Hospital Association (AHA, 1958) recommended that health care facilities establish Committees on Infections as efforts to minimize infections which were acquired in hospitals. These committees served as the first organized infection control programs in this country. Today, hospital infection control programs have flourished as they strive to achieve a common goal-- minimize nosocomial (hospital-acquired) infections.

Currently, nosocomial infections have been recognized as sources of costly problems for hospitals and patients. The intensity of problems caused by these infections was described by Castle and Ajemian (1987) as they wrote:

> Hospitals in the United States admit 40 million patients annually. Two million of these patients, about 5%, acquire a nosocomial infection. Approximately 20,000 people die each year from these infections, and nosocomial infections are a contributing cause of death in 60,000 other patients... nosocomial infections add 4-13 extra days of hospitalization and cost patients and insurers more than $2 billion each year (p. 3).

Because these rates are noted to significantly impact health

care delivery, more and more infection control practitioners have looked at ways that will effectively reduce nosocomial infection morbidity and mortality. Alternatives include disinfection/sterilization techniques, employee health programs, environmental cleaning, and handwashing practices.

Throughout the past decade, numerous infection control experts have conducted research specific to handwashing practices within the health care arena. The principles of handwashing (use of soap, running water, and friction for removal of transient flora from the hands) have been explored and many issues specific to the topic have been resolved. Most importantly, substantial research has promoted handwashing by hospital employees as an inexpensive, easy, and effective method of nosocomial disease prevention among hospital patients.

Despite extensive research though, numerous issues remain unresolved. A multitude of available handwashing agents leads to the controversy of which "soap" is the best to use during patient care delivery. Specifications as to which levels of patient contact necessitate handwashing remain in question. In most instances, attempts have failed to identify effective motivators for improving handwashing compliance. Specific reference to patient handwashing and its probable effect on the spread of microbes within the health care setting have been overlooked, or even ignored (Larson, 1988; Lawrence, 1983).

The personal experience of this researcher as a

medical/surgical staff nurse and as an infection control surveillance officer has informally identified that hospitalized patients often neglect their personal hygiene practices. Among the observed patients, hygienic practices noted most deficient included routine oral care, perineal care, and handwashing. Whether these personal care deficits result from preexisting patient values/health beliefs, the nature of the sick role, or from lack of nursing assistance in patient care, remains in question and merit further investigation. Usually, these areas of personal hygiene are considered behaviors that are learned during childhood and become habits of daily care as a result of lifestyle (Blattner, 1981; Starck, 1988). However, patients' concerns and abilities to complete even the simplest habitual tasks often become unimportant and overlooked during altered health states. Additionally, human excreta have been identified microbiologically as common and excellent media for growth of numerous clinical pathogens (Garner & Favero, 1986; Soule, 1983). The lack of patient handwashing may contribute to the transfer of inoculum (body substances which contain disease-causing microorganisms) from their hands to other compromised areas of the body (surgical incisions, gastrointestinal tract, respiratory tract), therefore causing cross-contamination and nosocomial infections (Larson, 1988).

Purpose

Because of limited documentation on the topic, a study specific to patient handwashing practices was undertaken to generate data on the subject. The purpose of this study was two-fold: to determine the levels at which ambulatory hospital patients perform handwashing and to assess both patient and employee knowledge and perceptions about patient handwashing practices. These concerns were investigated at two levels. First, an observational field study served to determine the mechanical processes that ambulatory patients demonstrated while washing their hands. Second, surveys were conducted among the same patients and their nursing personnel so that attitudes, knowledge and perception levels about patient handwashing could be identified. Analysis of the data and study findings would provide insight to the similarities and differences between behaviors, current knowledge, and perceptions regarding the importance of patient handwashing practices. With this in mind, it seemed fitting to study patient handwashing as a way to identify patient and staff teaching needs regarding the topic and to promote future programs to educate people on the importance of handwashing compliance in health care environments.

Significance and Justification

The importance of handwashing in hospitals is a concept that has been a topic of concern for over 100 years. In the mid-1800s, Oliver Wendell Holmes and Ignaz Semmelweis met with a lot of dissension as they tried to convince their

contemporaries that hospital-acquired infections were transmitted on people's hands, especially those of health care personnel. Their theories were discounted as being foolish and unscientific (Bryan, 1986; Daschner, 1985; Garrison, 1929; Miller, 1982; Murphy, 1941; Slaughter, 1950). In the late 1800s, Nightingale (1860/1969) shared Semmelweis' convictions. Her observations of nursing practice resulted in her own beliefs that "skin-cleanliness... removes noxious matter from the system quickly... so every nurse ought to be careful to wash her hands very frequently..." (p. 94). Similar thoughts have continued through the years, and in 1970 the Center for Disease Control (CDC) formally identified handwashing as the single most effective way to prevent nosocomial infections in hospitals (Garner & Favero, 1986). The stance of the CDC continues today.

The basic task of handwashing, using Feldman's 10-step handwashing criteria, has been recognized as a central component of hospital infection control programs and the process which should be practiced impeccably in order to prevent spread of disease (Garner & Favero, 1986; Gidley, 1987; Taylor, 1978). The indications for handwashing depend on the type, intensity, duration, and sequence of activities performed. According to the CDC guidelines, routine handwashing should be accomplished for a variety of contacts: before handling foodstuffs, before performing

invasive procedures, before and after touching wounds, and after situations where microbial contamination of hands is likely to occur, such as when attending to toileting needs (Garner & Favero, 1986).

In light of today's increased emphasis placed on client involvement in health management, patient handwashing must be included as an important aspect of nursing care in the acute care setting. If caregivers are thought to spread endogenous pathogens from one site to another on unclean hands, then patients can be capable of doing the same when they perform aspects of self-care (Larson, 1988; Lawrence, 1983). Thus, in an attempt to prevent colonization to another portion of their own already compromised bodies or to other individuals, it is of utmost importance that patients perform handwashing as a basic part of their personal hygiene.

To date, only minimal investigation of any quality addressing patient handwashing has been documented (Jackson, 1984; Lawrence, 1983; Pritchard, 1987). It has been commonly annotated, though, that actual handwashing of personnel occurs less than one-half of the time it is indicated in the hospital setting (Albert & Condie, 1981; Donowitz, 1987). Hospitalized patients have shown no better compliance than staff in practice of the task (Lawrence, 1983; Pritchard, 1987). In fact, Pritchard (1987) encouraged further study on the issue of patient handwashing and its compliance based on the findings of her study.

Perhaps an estimate of the scope and the size of the problem of insufficient patient handwashing can lend impetus to the problem's correction and eventually advance nursing practice, especially in the areas of infection control, staff development, and patient education. Through careful assessment of patient handwashing behaviors and further education of the impact of handwashing on infection control, patients and staff can work together to improve motivation and compliance involving all aspects of handwashing practices within hospital environments.

Research Questions

Seven research questions have been identified for this investigation. The research questions include:

1. What are the handwashing practices of ambulatory hospital patients?

2. What is the knowledge level of patients regarding handwashing?

3. What are the perceptions of patients regarding handwashing in hospitals?

4. What are the similarities and differences between knowledge of patients and patient handwashing practices?

5. What are the similarities and differences between demonstrated behaviors and stated patient handwashing practices?

6. What are the similarities and differences between knowledge levels stated by patients and the knowledge levels

stated by nursing personnel regarding patient handwashing practices?

7. What are the similarities and differences between the perception levels stated by patients and the perception levels stated by nursing personnel regarding patient handwashing practices?

Definition of Terms

Conceptual Definitions

In her definitions of nursing practice, Virginia Henderson identified conceptual definitions for nursing, health, environment, and person. The same definitions proved useful in coordinating and understanding this study, thus the conceptual definitions for this endeavor included:

1. NURSING: "To assist the individual, sick or well, in the performance of activities contributing to health or recovery of illness that he/she would perform unaided if that person had the strength, will or knowledge to do so..." (Henderson, 1964b, p. 15).
2. HEALTH: "The patient's ability to perform components of nursing care unaided... so as to reach the highest potential level of satisfaction in life..." (Henderson & Nite, 1978, p. 122).
3. ENVIRONMENT: "The aggregate of all the external conditions and influences affecting the life and development of the organism..." (Henderson & Nite, 1978, p. 829).

4. PERSON (Patient): "An individual who requires assistance to achieve health and independence or peaceful death..." (Henderson, 1964a, p. 65).

For the sake of this study, an additional conceptual definition was provided by the researcher. It is as follows:

5. ILLNESS: Any deviation from a patient's healthy state. The patient's inability to perform components of nursing care unaided so as to cause impediments to reaching the highest level of satisfaction with life. Illness is an altered health state.

Operational Definitions

The investigator selected six operational definitions for this research endeavor. The operational definitions used in this patient handwashing study include:

1. HANDWASHING PRACTICE: Patients standing or sitting at a sink and washing their hands according to Feldman's 10-step handwashing criteria (Gidley, 1987; Taylor, 1978). The quality of demonstrated handwashing practices will be evaluated by field observation and measured using the Patient Handwashing Observation Checklist (Appendix A). Stated handwashing practices will be measured by Sections II of the patient and employee handwashing surveys (Appendices B & C). Data generated by this definition can be applied to research questions # 1, 4, 5, 6 and 7.

2. KNOWLEDGE OF HANDWASHING: The facts or condition of knowing something about handwashing with familiarity gained through education, experience or association. The knowledge level of handwashing will be measured by Section III of the patient and employee handwashing surveys (Appendices B & C). Data generated by this definition can be applied to research questions # 2, 4, and 6.

3. PERCEPTION OF HANDWASHING: An awareness of the activities in the environment that relate to needs and practice of handwashing. The perception level will be measured by Section I of the patient and employee handwashing surveys (Appendices B & C). Data generated by this definition can be applied to research questions # 3 and 7.

4. NURSING PERSONNEL: Nursing care givers at all educational levels... to include registered nurses and military medical technicians. Data generated by this definition can be applied to research questions # 6 and 7.

5. PATIENTS: Clients admitted to an acute care facility in order to receive medically or surgically-oriented care in the attempt to alleviate impaired states of health. This study is limited to inpatients of ambulatory mobility status. Data generated by this definition can be applied to research questions 1 through 7.

6. HANDWASHING COMPLIANCE: The act or process of carrying out handwashing behaviors based on predetermined guidelines/indications about when handwashing should take place (Gidley, 1987; Garner & Favero, 1986). Patient handwashing compliance will be measured by field observation using Section I of the Patient Handwashing Observation Checklist (Appendix A).

Limitations and Delimitations

Limitations

There was the possibility of limited experimenter effect because of the professional capacity that the lone researcher undertook while collecting data. Although the researcher's appearance was similar to other hospital professionals, unit personnel and patients became aware that the researcher was not a permanent employee of the institution or units under study. As a result, the researcher's presence may have impacted patient data collection. Past experiences as an infection control practitioner demonstrated that employee handwashing behaviors became more noticeable when personnel realized the presence of this expert on their unit. In this study, similar behaviors may have occurred when the patients being studied knew the express purpose of the researcher's presence on the units. Thus, skewed data may have been collected with more handwashing noted than would have occurred in the absence of observations.

Data collection by observation may have served as another limitation. Past research observations have been found to offer subjective methods of measurement due to inconsistencies that can occur during the data collection process (Burns & Grove, 1987). To lend greater objectivity to data collection, the one nurse researcher standardized the patient observation process by using a predetermined checklist as the basis for observation criteria. Anecdotal notes were documented in Section III of the observation checklist to clarify questions/concerns raised by the researcher during patient observations.

Also, this study may have been limited by first time use of data collection tools. Three original tools were developed by this nurse researcher for the express purpose of studying handwashing practices among hospital patients. Because they had not been utilized in earlier studies, these tools did not have reliability and validity established by different populations, as would have been the case with use of preexisting tools. Thus, the degree of consistency with which the tools measured what they were intended to measure was poorly substantiated and was expected to limit the research findings.

Variables involving patient handwashing facilities may have limited the study findings, especially patient observations. The physical environment failed to provide standardization of sink locations, thereby limiting unobstructed observations of handwashing behaviors by all

ambulatory patients on the study units. Thus, the study population was limited to the patients whose behaviors could be clearly observed by the researcher. Empty soap and paper towel dispensers may have contributed to limited patient handwashing as well. Anecdotal notes were made when empty dispensers were encountered during patient handwashing activities.

The patient participants were selected from those who were mobile enough to wash their hands at a sink and demonstrate the mechanical process according to predetermined criteria. Patient access to a sink, running water, soap and paper towels was a critical factor in observing patient handwashing behaviors. Thus, the study of only ambulatory patients probably limited this study.

The generalizability of this study may have been limited by the fact that all data were collected on two in-patient units in one hospital. Thus, any conclusions that were reached may have been applicable only to the particular populations and samples under study.

Delimitations

In order to control for extraneous variables, two delimitations were considered. First, structured observations were conducted using a predetermined checklist so as to ensure objectivity during this segment of data collection. Second, a variety of times were used for distributing surveys and performing observations: before

and after meals, at scheduled treatment times, and before hour of sleep. Data collection performed at various times on differing days allowed for access to most "usual" patient handwashing times.

Assumptions

The primary study assumption was that patient handwashing constitutes a desirable behavior that serves as an important aspect of preventing nosocomial infections; the same way as indicated for handwashing among hospital personnel. This assumption was made since there has been little documentation published on the effectiveness of patient handwashing as it relates to control of infection. Another assumption was that value was placed on patient handwashing based on the actual process of patients washing (or wishing to wash) their hands as part of personal hygiene. Although all subjects were made aware of the study purpose through their completion of questionnaire surveys, the researcher assumed that the patients did not realize that they were being observed for actual handwashing events. This assumption stemmed from Albert and Condie's (1981) findings which stated that normal handwashing patterns can be assessed only if subjects are unaware that their behavior is being watched.

Summary

Chapter 1 included an introduction to the study of patient handwashing practices as they were perceived by nursing care givers and care recipients. Research

questions, definition of terms, limitations and delimitations, and assumptions for the study were identified. Chapter 2 will identify a review of the literature as it offers information on the topic of handwashing principles in the health care setting. Also, the conceptual framework of this study will be presented. Chapter 3 will examine the procedures for collection and treatment of data. The tools will be described and the rationale for the statistical testing to be utilized will be indicated. The setting, population, sample, and protection of human rights will be identified. Chapter 4 will present an analysis of data developed from the methodology described in the preceding chapter. The final chapter will conclude the study with a summary, conclusions, discussion of findings, implications for nursing practice, and recommendations for further research. The appendix will contain all printed materials utilized throughout this research project.

CHAPTER 2: THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Introduction

The practice of handwashing as an effective means to prevent disease spread is universally accepted among infection control leaders today. Past research studies have substantiated the need to teach and encourage handwashing practices among health care workers, but little has been documented to support the importance of patient handwashing. Because patient practices have been excluded from previously documented handwashing studies, this investigator agrees with other researchers who state that handwashing is only partially developed and requires further research (Jackson, 1984; Lawrence, 1983; Pritchard, 1987).

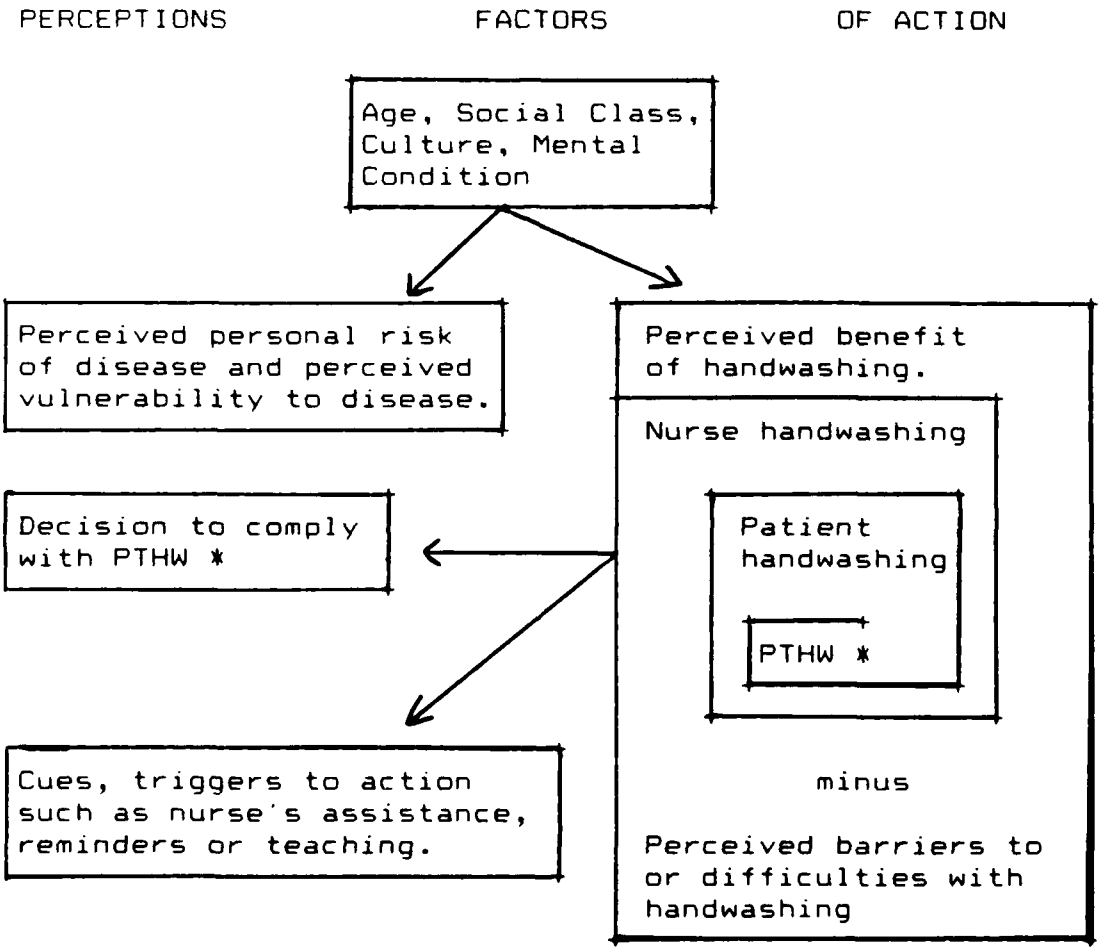
The theoretical framework selected for this study and a current literature review follow. The theoretical framework explains the conceptual base for handwashing and offers a model which includes patient handwashing as a significant action towards health promotion. Also, a review of literature provides an update of findings/trends related to handwashing and principles of patient handwashing.

Theoretical Framework

Pritchard's (1987) Patient Handwashing Model served as the theoretical framework for this study. By combining

components of handwashing theory (Slaughter, 1950) and the Health Belief Model (Becker, 1974), the Patient Handwashing Model (Figure 1) suggests that patients are most apt to practice handwashing if "they perceive a personal risk and vulnerability to disease, if they believe [post-toileting] handwashing will negate the risk and lower their vulnerability, and if they feel it will benefit their health and recovery" (Pritchard, 1987, p. 6).

While describing components of the Health Belief Model, Becker (1974) provided a basis for further understanding the components of the Patient Handwashing Model. Becker wrote that behaviors are determined by the way people perceive their health and their surroundings. Individuals maintain perceived vulnerability and susceptibility which result in readiness for action providing such action is perceived as being effective to reduce the threat of disease. In addition, individuals must perceive all barriers to action as being minimal and that internal/external cues will promote action. Becker (1974) identified that individual perceptions, modifying factors, and likelihood of action are all major components of the Health Belief Model. The same concepts apply to the Patient Handwashing Model, however Pritchard (1987) indicated that her newer model varies slightly. Pritchard (1987) stated that "...neither patients nor their nurses perceive a vulnerability or personal risk, and that nurses are not assisting or utilizing reminders, or teaching for patient [post-toileting] handwashing" (p. 7).



* PTHW signifies post-toileting handwashing.

Figure 1. The Patient Handwashing Model (Pritchard, 1987)

Thus, the Patient Handwashing Model differs from the Health Belief Model and serves more useful as the framework for this new patient handwashing study.

Review of Literature

Introduction

For longer than a century, handwashing has been universally accepted as a method to reduce contact transmission of microorganisms (Larson, 1988). In a review of literature written during the past decade, many sources have been identified that stressed the importance of handwashing within the health care environment, but only scant information has been found which alluded to patient handwashing practices (Larson, 1988; Pritchard, 1987). The purpose of this literature review is to update previous writings addressing handwashing principles and to gather information to substantiate the importance of patient, as well as employee, handwashing as an effective means to prevent the occurrence of nosocomial infections.

The Purpose of Handwashing

Over the years, the purpose of handwashing has remained constant. Gidley (1987) stated that handwashing serves to remove transient organisms that are not usually a part of normal skin flora. Transient organisms are described as those that can be picked up during contact with infected patients or equipment/supplies (bedpans, urinals, measuring devices) and able to be easily removed by effective

handwashing techniques.

Other authors agreed in stating the same general purpose for handwashing: to remove transient organisms from hands (Larson, Leyden, McGinley, Grove, & Talbot, 1986; Maki, 1986; Morrison, Gratz, Cabezudo, & Wenzel, 1986). These researchers discussed handwashing practices as they relate exclusively to health care personnel; they did not address patient handwashing.

In 1970, the Center for Disease Control (CDC) identified handwashing as "the single most important procedure for preventing nosocomial infections" (Garner & Favero, 1986, p. 233). This announcement set a standard for today's infection programs (Bjerke, 1987; Bryan, 1986; DeCrosta, 1986; Donowitz, 1987), by indicating that handwashing should not be overlooked in health care practice. However, the opposite is often true.

Rate of Handwashing Compliance

Current literature shows handwashing as an overwhelmingly neglected practice among health care professionals (Albert & Condie, 1981; Daschner, 1985; DeCrosta, 1986; Donowitz, 1987; Kaplan & McGuckin, 1986; Larson, 1985; Sedgwick, 1984). Larson (1985) discussed several studies conducted since 1965, and in most cases, researchers found that nurses failed to wash their hands when involved in patient-related activities.

Albert and Condie (1981), Daschner (1985), Donowitz (1987), and Kaplan and McGuckin (1986) agreed that

handwashing is neglected practice among health care workers. These researchers studied handwashing compliance and each identified that hospital personnel washed their hands less than one-half of the times when it was indicated.

Albert and Condie (1981) evaluated the handwashing practices of intensive care unit (ICU) personnel. They observed these staff members to have washed their hands after only 41% of all contacts with patients or patient support equipment. Donowitz (1987) found similar results when he studied personnel handwashing within a pediatric ICU setting. This study concluded that handwashing was important in policy but neglected in practice when the findings indicated 21% handwashing compliance among physicians, 37% among nurses, and 22% among ancillary service personnel. Neither of the above studies investigated patient handwashing compliance.

Reasons for Poor Handwashing Compliance

Several researchers studied probable reasons for poor handwashing practices among health care workers: lack of knowledge in identifying significant need for the process and improper use of agents (Hill, 1984; Mayer, Dubbert, Miller, Burkett, & Chapman, 1986; Morrison, Gratz, Cabezudo, & Wenzel, 1986; Ward, 1985), poor logistics (Crow, 1986; Kaplan & McGuckin, 1986), and discomforts to skin after repeated washings (Crow, 1986; Hoffman, Cooke, McCarville, & Emmerson, 1985; Jacobson, 1986; Larson, Leydon, McGinley, Grove, & Talbot, 1986). Whether or not patient handwashing

would be adversely affected for the same reasons was not mentioned, however this author assumes that clients would be susceptible to the same problems.

Little knowledge of effective handwashing techniques should not be an excuse for poor compliance, but it is often used. Ward (1985) stated that proper orientation to hospital infection control programs is essential to improve workers' knowledge of current policies and proper techniques for washing hands and disinfecting the environment. Benefits to patients were not addressed. Poor logistics was indicated as another reason for noncompliant handwashing practices. Crow (1986), Kaplan and McGuckin (1986) and Sedgwick (1984) all agreed that location of sinks with running water, types of cleaning agents, and quality of paper towels are all instrumental in whether or not health care workers wash their hands. The authors failed to indicate whether or not these inconveniences would deter patient handwashing as well.

Crow (1986) and Seitz and Newman (1988) talked about noncompliance as the result of skin discomfort. Repetitive and persistent handwashings cause known physiologic (chapping, scaling, cracking, and erythema) and microbiologic (sloughing of cells) changes of the skin, causing decreased motivation to wash. In this study also, discussion of patient handwashing was not included.

The Mechanical Process

Another aspect of handwashing studied was the

mechanical process itself. Favero and Garner's (1986) article defined handwashing as " a vigorous, brief rubbing together of all surfaces of lathered hands, followed by rinsing under a stream of water" (p. 233). Gidley (1987) agreed that this description constitutes the method of effective handwashing, but added that in her study, only half of the 33 nurses observed used soap or generated enough friction to lather the soap on all hand surfaces. Patient handwashing techniques were not addressed, but this researcher assumes that hospital clients should utilize the same handwashing standards as those listed for personnel.

Currently, handwashing agents in most hospitals range from plain soap and water to high-level germicidal antiseptics. When, where, and how much of an agent is needed for effectiveness depends on many factors and remains a topic open for debate among handwashing researchers (Bartzokas, Corkill, & Makin, 1987; Bjerke, 1987; Crow, 1986; Faix, 1987; Hill, 1984; Larson, 1986; Larson, Eke, Wilder, & Laughon, 1987; Massanari & Hierholzer, 1984). Larson (1986) stated that antiseptic agents are necessary to decrease colony-forming units on the skin, whereas Massanari and Hierholzer (1984) found no significant differences in nosocomial rates when washings were accomplished using nongermicidal agents. Appropriate agents for patient handwashing were not addressed in the literature.

Organisms Found on the Hands

The presence of gram-negative organisms on the skin has been identified to impact general health status negatively (Daschner, 1985; Larson, 1984; Noble, 1986). Larson (1984) studied ICU workers and found 22 different species of gram-negative organisms carried persistently on the hands of 21% of the staff. These employees had provided direct patient care or manipulated equipment such as urine bags, intravenous dressings, or respiratory apparatuses. In each instance, patient care was carried out without intervening handwashing noted by the research observer.

Daschner (1985) conducted a similar study and found that 27% of all workers' hands were colonized with various gram-negative bacteria: *Enterobacter cloacae, Pseudomonas aeruginosa, Staphylococcus aureus, Klebsiella pneumoniae, and Enterobacter agglomerans.* The same gram-negative organisms were singled out as the leading causes of most nosocomial pneumonias, urinary tract infections, and post-operative wound infections.

Implications of Patient Handwashing

In this literature search, only one published author studied patient handwashing. Lawrence (1983) stated, "If the hands of ward staff are contaminated by bacteria, the hands of patients must also be colonized, and the need for scrupulous hand hygiene for patients is clear, particularly after such procedures as urination and defecation" (p. 24). Based on this assumption, Lawrence (1983) conducted a survey

among hospital patients to determine if they washed their hands in the hospital as often as they did at home. Negative responses were received from 17 of the 20 patients surveyed. Reasons for handwashing noncompliance among these patients included: no opportunity to wash, nurses were not available to help patient, and inability of patients to get to the bathroom to wash hands.

In another published study, the Department of Health and Human Services implemented the Teddy (T.) Bear Program in a national effort to decrease nosocomial infections by encouraging handwashing among hospital workers. The use of a symbolic, stuffed teddy-bear (T. Bear) was used to encourage sick children to remind hospital employees to wash their hands before providing patient care. Hughes, Williams, Williams, and Pearson (1986) suspected that the stuffed bear might serve as a contaminating fomite and thus invalidate the whole purpose of the program. By using a pre-established culturing regimen, the researchers found that the T. Bears indeed grew out multiple gram-negative organisms that were being transmitted by people having casual contact with the toy. Patients were included as significant sources of contact in this study, thus reinforcing the need for patient handwashing.

Aside from implications made in the T. Bear study and the Lawrence (1983) study, no other health care literature presented information comparing empirical findings to the

actual practice of patient handwashing. The topic of handwashing has been addressed within other disciplines, however. Lopez, DiLiberto, and McGuckin (1988) and Nahata (1985) discussed the importance of promoting frequent handwashing among daycare children in an attempt to control diarrheal and respiratory diseases. Glasby and Snow (1986) added credibility to Nahata's findings when they introduced "Scrubby Bear", an incentive program which emphasizes handwashing as an effective way to control infections in day care and preschool facilities. The "Scrubby Bear" Program in schools closely paralleled the T. Bear Program in hospitals. Similarly, Pete (1986) offered documentation on the importance of handwashing among school-aged children as a way to control various communicable diseases.

The Garner and Favero (1986) article offered an excellent overview of revisions recently made in the CDC Guideline for Handwashing and Hospital Environmental Control. Recommendations were listed which encourage effective personnel handwashing, however recommendations for patient practice were not identified.

In an unpublished work, Pritchard (1987) studied patient post-toileting handwashing among 20 patients on a medical (respiratory) care unit. She found 50% handwashing noncompliance among ambulatory patients and 100% noncompliance among nonambulatory patients. Pritchard also reviewed patient and nurse perceptions of patient handwashing needs. Pritchard identified a gap between the

knowledge of the need for patient handwashing and the actual application of the process. In the same study, nurses and patients expressed specific reasons why patient handwashing was important to infection control, but patient handwashing was not demonstrated in practice. Pritchard's (1987) study concluded with the assumption that lack of correct handwashing behavior was the result of poor motivation or miscommunication between patients and nursing personnel.

Summary

In this chapter, Pritchard's (1987) Patient Handwashing Model, adapted from Becker's (1974) Health Belief Model, was identified as the theoretical base for this study. An extensive review of literature revealed employee handwashing as an effective way to prevent disease. The mechanical process and purpose of handwashing were discussed. Some of the common organisms of the skin which cause nosocomial infections were identified. Poor handwashing practices were demonstrated among health care personnel and several reasons for poor compliance rates were uncovered.

Patient handwashing was scarcely mentioned in the literature however. Only two authors discussed patient handwashing practices (Jackson, 1984; Lawrence, 1983). In these studies, patients had the knowledge of handwashing needs, but they failed to wash their hands, much the same as was noted by hospital personnel. In one unpublished work (Pritchard, 1987), patients and their nurses recognized the

need for patient post-toileting handwashing, but handwashing behavior failed to be observed in practice.

Indeed, further study of patient handwashing is indicated. Conscious efforts must be taken to make this portion of patient hygiene an important part of employee/patient education and practice.

CHAPTER 3: METHODOLOGY

Introduction

The methods for this descriptive research study included two types: field observation and survey by questionnaire. An observational field study was conducted to assess actual handwashing behaviors demonstrated by ambulatory hospital patients (the events that most frequently precluded patient handwashing behaviors and the extent of patient handwashing techniques). In addition to the observational field study, questionnaires were administered to ambulatory inpatients and their nursing personnel in order to assess each group's knowledge level and perceptions about patient handwashing.

Setting

A midwestern military medical center, housing 200+ patient care beds, served as the general location for this handwashing study. The field setting for data collection was limited to two inpatient nursing units (one general medicine/oncology unit and one general/cardiovascular surgery unit) where care was rendered exclusively to adult patients, both male and female.

The study units consisted of 23 noncritical patient care beds and were divided into configurations of three private and 10 semi-private patient rooms. All patient

rooms were equipped with their own bathroom facilities and had handwashing centers available for patient and staff use. Although the handwashing centers were not centrally located in all rooms, each center was comprised of a small stainless steel sink, a paper towel dispenser, and a liquid soap dispenser for an antimicrobial cleansing agent. In the rooms where patients were observed, the handwashing facilities were clearly visible from the hallway where the observer stood unobtrusively.

Data were gathered over a four-week period. Eligible nursing personnel were contacted by the researcher and invited to participate in the study. The researcher followed up the 4-week observation period by contacting patients individually to invite them to participate in the survey and to answer any questions. For individuals wishing to participate, as much time and as private a space as possible were arranged for completion of surveys.

Sample

Two populations were sampled: ambulatory patients hospitalized in noncritical medical and surgical units, and nursing personnel who provided nursing care to those patients. Criteria for persons included in the patient sample were as follows:

1. Current hospitalization for at least two days on one of the designated study units;
2. Medical or surgical diagnosis;
3. Age of 18 years or older;

4. Ambulatory status, with or without assistance;
5. Alert and oriented to time, place and person; and
6. Ability to read.

The patient sample was divided into two subgroups: ambulatory patients receiving medical care and ambulatory patients receiving surgical care.

Ambulatory patients were those who assisted in their inpatient care delivery. They performed their activities of daily living, ambulated to the bathroom to tend to toileting needs, and participated in various aspects of self care (wound care, respiratory treatments, etc.) with or without the help of nursing personnel.

In the nursing personnel sample, subjects must have been employed within the selected hospital on their units for at least three months. Only nursing personnel permanently assigned to the two study units were considered for the study. The personnel sample was divided into two subgroups: registered nurses and military medical technicians. Because all employees involved in this study were active duty military personnel, their job descriptions were compared to those of civilian counterparts. The professional responsibilities of the military nurses closely paralleled those of civilian nurses. The job descriptions of auxiliary personnel differed. The duties and responsibilities of the military medical technicians expanded beyond those expected of civilian nursing

assistants. (The military medical technician job descriptions are offered in Appendix D).

Convenience sampling was used in this handwashing study. All subjects were chosen based on their willingness to participate in the study. All ambulatory patients whose handwashing behaviors could be seen by the researcher, and all nursing personnel caring for the patients on the two study units, were asked to participate. The size of the patient sample totaled 40, with participation of 20 patients from each unit subgroup. The size of the nursing personnel sample was 35, with participation of 22 registered nurses and 13 military medical technicians.

Methodology

The methodology used in Pritchard's (1987) patient post-toileting handwashing study included field observations and surveys by questionnaire. The same strategies were employed in this descriptive handwashing study although data were collected utilizing original tools developed for this study; the current research extended beyond the scope of post-toileting behaviors.

Use of structured field observation study techniques enabled the researcher to record handwashing behaviors among patient participants. The nurse researcher recorded observations at two levels. First, patients were monitored for specific incidents which indicated the need for handwashing. A list of predetermined indicators for handwashing was used to annotate each incident. When

handwashing was accomplished, then the quality of the mechanical process demonstrated during patient handwashing was recorded. When the patients failed to wash their hands following the occurrence of a predetermined indicator, the lack of patient handwashing was recorded by the observer.

Because all patients on the designated units could not be observed at one time, the researcher observed patients in small study groups or cells. Each cell was comprised of three to four patient rooms that were located in close proximity. Although room numbers differed on the two nursing units, the floor plans were identical and the cell concept was applied similarly on each unit (Appendices E & F). There were four study groups on each unit.

The researcher observed the study units in a manner similar to that documented in Pritchard's (1987) patient handwashing study. Each predetermined group of patient rooms (study unit) was viewed one at a time for 15 minute intervals. The observation periods were conducted at various times of the day (early morning before breakfast, mid-morning, noon time, and mid-evening before hour of sleep) using a cyclical schedule (Appendix G). Each study unit was observed at least once during each of the specified observation periods. Fifty-two observation intervals were completed. This process continued until all ambulatory patients in each study unit who could be seen by the

researcher were observed at least once for handwashing. The researcher documented the handwashing observations on a predetermined checklist (Appendix A).

The second part of the study employed questionnaires to measure knowledge and perceptions about the importance of patient handwashing. The same patients who were observed for their handwashing behaviors were assisted in completing the Patient Handwashing Survey (Appendix B) after informed consent was obtained by the researcher. All nursing personnel on the same units were asked to complete the Employee Handwashing Survey (Appendix C) after the purpose of the study was explained by letter and at unit staff meetings. Completed employee surveys were mailed to the researcher's business address.

Data Collection Tools

Three original tools were utilized for data collection in this handwashing study. The Patient Handwashing Observation Checklist (Appendix A) was used to document actual handwashing practices whenever such behaviors or indications for behaviors were observed by the researcher. The Patient Handwashing Survey (Appendix B) and The Employee Handwashing Survey (Appendix C) served to assess subjects for their individual knowledge levels and perceptions regarding patient handwashing practices.

The tools were developed by the researcher and the contents of each were based on specific criteria identified in earlier handwashing research studies (Garner & Favero,

1986; Gidley, 1987; Lawrence, 1983; Pritchard, 1987; Taylor, 1978). Each tool related generally to personal hygiene and specifically to handwashing. Because the statements were depersonalized and answers were indicated on a Likert Scale, responses were considered objective.

Validity and reliability were established for these original tools. Content validity was determined by expert input (Burns & Grove, 1987). A pilot study was conducted to determine readability of the questionnaires used in the study. The test-retest method was implemented to determine reliability of the employee survey, but no reliability of the patient survey was established.

Patient Handwashing Observation Checklist

The Patient Handwashing Observation Checklist (Appendix A) included patient demographics, the predetermined indicators for patient handwashing behavior, handwashing evaluation criteria for ambulatory patients, and anecdotal notes. This tool was used solely by the investigator for documentation of field observations. Patient demographics included an identification number (the patient's room and bed number), age, gender, race, admission diagnosis and specialty service (medical or surgical). The date of observation, length of the handwash in seconds, and type of agent used for handwashing were noted.

Section I addressed the indicators for patient handwashing behavior. The five indicators for handwashing

listed were based on recommendations published by the CDC (Garner & Favero, 1986):

1. Post-toileting;
2. Before eating/drinking;
3. Before contact with wound, dressing, or drainage tubes;
4. After contact with wound, dressing, or drainage tubes;
5. After contact with potentially contaminated fomites (supplies, equipment).

From this list, the event that preceded actual patient handwashing behavior was identified. A single category in Section I was annotated for each patient observation. Numerical scores were not assigned to this observation; findings were reported out as frequencies and simple percentages. Section II listed evaluation criteria so the mechanical process/method of handwashing that patients demonstrated could be assessed. In this section, observed handwashing behaviors of ambulatory patients were assessed using Feldman's 10-step handwashing criteria (Table 1) as the accepted standard for effective handwashing in hospitals (Gidley, 1987; Taylor, 1978). The researcher scored each indicator based on the observation of the patient washing his or her hands. Numerical scores were assigned to each criteria with values ranging from 0 to 2, with 0 indicating poor handwashing practice and 2 indicating excellence. Detailed definitions for the value of each indicator are

Table 1

Feldman's Handwashing Criteria

1. Used soap
   - 2- visible lather
   - 1- contact with soap but no lather
   - 0- no contact with soap
2. Used continuously running water
   - 2- did
   - 0- did not
3. Positioned hands to avoid contaminating arms
   - 2- held hands down so that water drained from fingertips into sink
   - 1- held hands parallel with arms so water drained from hands into the sink
   - 0- held hands so that water drained onto arms
4. Avoided splashing clothing or floor
   - 2- no splashing
   - 1- minimal splashing
   - 0- vigorous splashing
5. Rubbed hands together vigorously
   - 2- vigorous rubbing
   - 1- minimal rubbing
   - 0- no rubbing
6. Used friction to all surfaces
   - 2- dorsal, ventral, interdigital
   - 1- one or two of the above
   - 0- did not use friction
7. Rinsed hands thoroughly
   - 2- all surfaces; dorsal, ventral, interdigital
   - 1- one or two of the above
   - 0- did not rinse
8. Held hands down to rinse
   - 2- did
   - 0- did not
9. Dried hands thoroughly
   - 2- dried all surfaces
   - 1- dried one or two surfaces
   - 0- did not dry
10. Turned tap off with paper towel
    - 2- did
    - 0- did not

Scale: 2= high quality practice (effective handwashing)
0= poor quality practice (ineffective handwashing)

Source: Gidley, C. (1987). Now wash your hands! Nursing Times, 83(29), p. 41.

found on the tool (Appendix A) and in Table 1. Possible scores for Section II ranged from 0 to a maximum of 20 points.

In Section III of the Patient Handwashing Observation Checklist, anecdotal notes were documented by the nurse researcher. In this section, the researcher identified variables which were not included in the checklist but which may have influenced the quality or quantity of patient handwashing behaviors: wound dressing to the hand, intravenous needle in the hand or wrist, empty soap container, no paper towels in the dispenser, major pain, physician visit, drying hands on cloth towel, etc.. Anecdotal notes were subjective comments made by the researcher to which no numerical scores were assigned. Findings were described and reported as frequencies and percentages.

Patient Handwashing Survey

The Patient Handwashing Survey (Appendix B) was comprised of patient characteristics followed by three groups of declarative statements. Age, level of education and current job status were survey questions related to patient characteristics. Whether or not participants ever worked in a health care facility or ever attended handwashing classes were also questioned. Of the 36 declarative statements, the first 13 addressed beliefs, opinions, and attitudes about handwashing and served to

evaluate perceptions and values held by patients about the topic. Responses to statements 1 through 13 were selected from Likert Scale responses of "strongly agree", "agree", "uncertain", "disagree", and "strongly disagree". In Section II, statements 14 through 28 commented on patient handwashing practices. These 15 statements served as self reports of actual handwashing behaviors, both in the hospital and at home. Responses to statements in Section II were selected from Likert-like Scale responses of "always", "usually", "sometimes", "hardly ever", and "never". The last 8 statements (# 29-36) were based on facts about handwashing in hospitals and were intended to test the knowledge base of patients regarding the topic of handwashing. Responses to these statements were indicated as either "True" or "False".

Scoring of the Patient Handwashing Survey was accomplished using two systems. First, the Likert Scale responses were numerically scored. Each answer to statements 1 through 13 was assigned a value from 1 to 5, with 1 indicating "strongly disagree" and 5 "strongly agree". Scale values of negatively expressed items (statements # 10 and 11) were reversed (Burns & Grove, 1987). Each statement was worth up to 5 points with the possible scores for Section I ranging from 13 to 65 points. Similarly, each response to statements 14 through 28 was assigned a value of 1 to 5, for these statements 1 indicated "never" and 5 "always". Again, each statement was worth a

possible 5 points thereby providing potential scores ranging from 15 to 75 points. A second system was incorporated to score handwashing facts or knowledge in Section III. The answers to statements 29 through 36 were assigned values of 2 or 0, with 2 indicating a correct response and 0 an incorrect response. Each inquiry was worth a maximum of 2 points and the knowledge scores ranged from 0 to a maximum of 16 points.

Employee Handwashing Survey

The Employee Handwashing Survey (Appendix C) was made up of demographic items followed by three groups of declarative statements. Employee demographics included age, gender, race, educational level and professional credentials of nursing personnel subjects. Whether or not structured handwashing classes had been taught by the participants, offered on the units of study, or included in unit orientation programs were also surveyed. Of the 46 declarative statements, the first 22 addressed beliefs, opinions, and attitudes about patient handwashing and served to evaluate perceptions held by nursing personnel on the topic of patient handwashing. These items indicated how nursing personnel perceive patient attitudes regarding the importance of handwashing. In section II, statements 23 through 33 focused on patient handwashing practices. These statements served to report perceptions held by nursing personnel regarding the extent of actual handwashing

behaviors demonstrated by hospitalized patients during the health care delivery process. Responses to statements 1 through 22 were selected from Likert Scale response sets of "strongly agree", "agree", "uncertain", "disagree", and "strongly disagree". Responses to statements in Section II (statements 23 through 33) were selected from Likert-like Scales of "always", "usually", "sometimes", "hardly ever", and "never". The last 13 statements (# 34-56) were based on facts about patient handwashing in hospitals and were intended to test the knowledge base held by nursing personnel on the topic. Responses to the last 13 statements were indicated by the answer of "True" or "False".

Scoring of the employee questionnaire was accomplished using the same scoring systems as the patient questionnaire. The Likert Scale responses for statements 1 through 22 were assigned values from 1 to 5, with 1 indicating "strongly disagree" and 5 "strongly agree". Again, the scale values of negatively expressed items (statements # 6, 8, 11, 19 and 22) were reversed prior to data analysis. Each statement was worth a maximum of 5 points and scores for Section I could range from 22 to 110 possible points. Statements in Section II were scored in a similar manner. The Likert Scale responses for statements 23 through 33 were assigned values from 1 to 5, with 1 indicating "never" and 5 "always". Each statement could equal as many as 5 possible points and the scores for this section could range from 11 to 55 possible points. Responses to items 34 through 46,

which tested for handwashing knowledge, were assigned values of 2 or 0, with 2 indicating a correct response and 0 an incorrect response. A maximum of 2 points could be scored for each response making possible scores for Section III range from 0 to 26 points.

Limitations of the Tools

In order to simplify the observation process, indicators for patient handwashing listed in Section I of the observation checklist were limited to five of the 11 published by the CDC (Garner & Favero, 1986). See Appendix H for the list of indicators recommended by the CDC. Patient exposures to physical contact with others (visitors, health care workers, other patients); smoking; coughing, sneezing or blowing nose; and combing/brushing hair were considered incidental to transmission of life-threatening nosocomial infections in hospitals and were eliminated as times when patient handwashing was critical. Thus, patient handwashing behaviors in relation to these specific occurrences were not monitored.

Because no literature was identified regarding approved patient handwashing techniques, the use of Feldman's criteria (Gidley, 1987; Taylor, 1978) may have affected the findings of patient observations. Feldman's criteria were developed to monitor handwashing behaviors of health care personnel; the same criteria may have proven too precise a process for patients to routinely demonstrate.

Handwashing knowledge of participants was assessed in Section III of the patient and employee surveys. Because all knowledge/fact statements were structured to receive a "True" response, there was strong possibility that participants may not have used as much discretion in selecting these responses as they may have for answering the remainder of the surveys. As a result, the reported findings for Section III may have been biased.

Validity and Reliability of Tools

Content validity was established by expert input into the design of the observation checklist and the patient and employee surveys. An infection control program instructor and a military infection control consultant advised the researcher to the development of each tool. Face validity was established by a panel of experts. Seven certified infection control nurses, all members of a local Association of Practitioners in Infection Control (APIC) chapter, read the instruments, evaluated their contents and provided recommendations for changes. Changes as indicated by the review were made in each tool before they were used to collect data.

A pilot study was conducted to determine readability of the patient and employee questionnaires (Burns & Grove, 1987). Pilot study subjects consisted of five patients and five nursing personnel assigned to one surgical unit, a unit other than those designated for data collection. The subjects were asked to answer each item on their respective

surveys, to write comments regarding ambiguous/confusing statements, and to annotate the number of minutes it took to complete their responses. Recorded response times indicated a maximum of 12 minutes for patients and as long as 20 minutes for nursing personnel. Both groups indicated that the questionnaire formats were clear, concise, easy to read, and required little time or effort for making response selections.

The test-retest method was used to establish reliability of the employee tool. The aforementioned nursing personnel (n=5), who had answered the employee survey previously for readability purposes, were given the same questionnaire one month later; however only three were returned to the researcher. During test and retest, identical responses to each declarative statement were ideal, however a reliability of 0.67 was considered an acceptable correlation coefficient. For scoring purposes, if participant retake responses were removed from previous answers by one, then the two responses were considered a match. Three nursing personnel answered 46 items for 138 possible matches; 137 matches were obtained. Despite this high correlation, the size of the sample (n=3) may have limited this estimate of reliability.

Treatment of Data

Upon completion of data collection, the data analysis was done manually according to guidelines recommended by the

Wright State University Statistical Consulting Center and the researcher's thesis advisor. Because manual calculation involving a great number of data carries a high risk of error, several accuracy safeguards were observed. All calculations were done at least twice and, when possible, using two different methods. Additionally, all raw numbers were reviewed and every calculation was reworked by a second individual. Where discrepancies existed, calculations were redone independently by each of two individuals until identical values were reached. Burns and Grove (1987) was used as the primary statistical reference. Because this handwashing study was intended to report descriptive findings, summary statistics were used to analyze data. Patient and staff demographics were reported out as frequencies and measures of central tendency (mean, median, mode). Actual patient handwashing behaviors, responses to patient surveys, and responses to employee surveys were ranked according to ordinal-scale levels of measurement (5= strongly agree to 1= strongly disagree; 5= always to 1= never; or 2= correct response or True and 0= incorrect response or False) and described as frequencies, simple percentages and measures of central tendency. Data were analyzed for each subset of patients (medical patients; surgical patients), for each subset of nursing personnel (registered nurses; military medical technicians), and in the aggregate for each group (total patients; total nursing personnel). Similarities and differences in findings were

described by comparing the raw numbers, percentages, and mean scores of each subset or group being reviewed. No statistical correlations were computed.

Ethical Considerations

Several ethical considerations were employed to protect the human rights of all subjects. Written approval for this research was obtained from the Wright State University Institutional Review Board (Appendix I) and from the Nursing Research Committee of the participating hospital (Appendix J).

Participants were provided with a general information letter (Appendices K & L) and written instructions were included as part of the patient and employee surveys. The researcher's business phone number was printed in both general information letters with an invitation for participants to call if they had questions or concerns pertaining to the study. The general information letters to patients included the statement that participants could receive a summary of the study findings if they so desired, and a stamped postcard for their requesting the same was provided (Appendix M). A report summary was mailed to each of the 12 patients who requested it and to each nursing unit involved in the study.

At the time of survey distribution, all subjects were informed of their human rights as research participants. The researcher explained that participation was purely

voluntary and that people choosing not to participate would in no way be adversely affected. Informed consent was obtained from all patients wishing to participate in the study (Appendix N).

For all patients, the nurse researcher explained the procedures, read the cover letter, and verbally asked the survey questions. This process was accomplished after patient handwashing observations were completed. Only those patients whose handwashing behaviors were observed (n=50) were asked to answer the patient survey. If at any time patients requested exception to participating in the study, all documentation of their handwashing observations and survey responses were destroyed by the researcher (n=10). When requested by individual patients, the researcher provided patient subjects with verbal feedback of their demonstrated handwashing behaviors. Printed handwashing literature (Appendix O) was made available and on-the-spot instruction regarding the importance of handwashing in hospitals was emphasized. All patient surveys and all handwashing observation checklists were numerically coded by the researcher so patients could not be identified by name. All patient data were analyzed in the aggregate so as to ensure confidentiality. Patient caregivers had no access to the information given by patient subjects.

Blank employee surveys (n=55) were distributed to personnel mail boxes on each of the designated study units. Volunteering participants completed their surveys privately

and mailed responses directly to the researcher using the stamped, addressed envelopes provided (n=37). Willingness to complete the Employee Handwashing Survey served as informed consent for nursing personnel respondents. Individual employee surveys were coded numerically when they were received by the researcher, thus ensuring confidentiality of all nursing personnel. Again, data were analyzed in the aggregate; no individual employees were identified.

Summary

In this chapter, the methodology for a patient handwashing study was described. The setting, population, and sample used in the research were defined. Two methods of data collection employed by the researcher were discussed: field observation and survey by questionnaire. Ethical considerations were presented and the treatment of data was introduced. In Chapter Four the response rates will be identified and the samples will be described in detail. Results of the data analysis will be discussed and related to the research questions.

CHAPTER 4: DATA ANALYSIS

Introduction

Having established the procedure for collection and treatment of data in Chapter 3, the focus of this chapter is on what the analysis of data revealed. The response rate to survey distribution will be discussed, the samples will be described, then the findings of the analysis of data will be related to each of the seven research questions.

Response Rate

Fifty patients were asked to participate in the study after their handwashing behaviors were observed by the researcher. Ten patients (20%) declined participation for a variety of reasons: physical pain, fatigue, and lack of interest. (Post-observation checklists for these ten patients were destroyed and data were not analyzed.) After informed consent was obtained and instructions were given, the Patient Handwashing Survey was distributed to the 40 participants. Forty patient surveys (100%) were completed and returned in person to the researcher during the observation times.

The Employee Handwashing Survey was distributed to 55 nursing personnel with 37 (67%) being returned. Two employee surveys were received incomplete, thereby making only 35 (64%) employee surveys suitable for tabulation and

analysis. According to Polit and Hungler (1983) and Burns and Grove (1987), a response rate greater than 50% is probably sufficient to warrant representativeness of the sample and to assume the absence of biases.

Description of Samples

There were two primary samples: ambulatory hospital patients (n=40), and nursing personnel who provided nursing care to those patients (n=35). In the patient sample, half (n=20) received nursing care on a medical unit and half (n=20) received surgical care on a different unit. In the employee sample, 63% (n=22) were registered nurses and the remaining 37% (n=13) were military medical technicians. Nursing personnel from the medical unit made up 60% (n=21) of the employee population; 40% (n=14) were surgical nursing staff.

In accordance with previously stated criteria, all patients were ambulatory. Tables 2 and 3 show tabulations of descriptive statistics, frequencies and percentages for the demographic data of the patient aggregate and subgroups. Patient diagnoses varied widely. There were 25 different primary diagnoses among the individuals; nine diagnoses were duplicates (see Tables 4 and 5). Eleven (28%) patients had intravenous catheters to their forearms, wrists or hands and one patient wore a forearm cast which incorporated her hand. The apparatuses worn by these 12 patients limited the extent of their handwashings. Of the 40 patient subjects, 28%

Table 2

Characteristics of the Patient Subjects (n=40)

Variable	Range	Mean	Median	Mode
Age	25-78	56	58	55,58,67
Gender		Number		Percent
Male		19		47
Female		21		53
Race				
White		35		88
Black		5		12
Education				
High School or Less		26		65
Two Years of College or More		14		35
Work Status				
Full-time		12		30
Active Duty Military		(7)		(18)
Civilian Nonmedical		(4)		(10)
Medical/Nursing Fields		(1)		(2)
Part-time		1		2
Retired/Disabled		19		48
Unemployed		8		20

Table 3

Characteristics of Subsets of Patient Participants

Variable	Medicine Service (n=20)		Surgery Service (n=20)	
Age				
Range	25-78		27-70	
Mean	59		52	
Median	64		55	
Mode	67		48,55,58	
Gender	Number	Percent	Number	Percent
Male	11	55	8	40
Female	9	45	12	60
Race				
White	17	85	18	90
Black	3	15	2	10
Education				
High School or Less	13	65	13	65
2 or > Yrs College	7	35	7	35
Work Status				
Full-time	5	25	7	35
Active Duty Military	(2)	(10)	(5)	(25)
Civilian Nonmedical	(2)	(10)	(2)	(10)
Health Care Fields	(1)	(5)	(0)	(0)
Part-time	0	0	1	5
Retired/Disabled	11	55	8	40
Unemployed	4	20	4	20

Table 4

Patient Diagnoses on the Medicine Unit (n=20)

	Medical Diagnosis	Number
1.	Diabetes	3
	Uncontrolled	(1)
	Diabetic Ulcer to Extremity	(2)
2.	Restrictive Lung Disease	5
	COPD	(3)
	Asthma	(2)
3.	Coronary Artery Disease	2
4.	Low Back Pain	1
5.	Pneumonia	1
6.	Cancer	3
	Small Cell Carcinoma	(1)
	Breast Cancer	(1)
	Lymphoma	(1)
7.	Strep Tonsillitis	1
8.	Small Bowel Obstruction	1
9.	Urinary Catheter Infection	1
10.	Sarcoidosis	1
11.	Resolved Myocardial Infarct	1

Table 5

Patient Diagnoses on the Surgery Unit (n=20)

	Surgical Diagnosis	Number
1.	S/P* Thyroidectomy	1
2.	S/P Femoral/Popliteal Bypass	1
3.	S/P Prostatectomy	2
4.	S/P Hernia Repair	4
	Inguinal	(3)
	Ventral	(1)
5.	S/P Skin Graft	2
	Leg	(1)
	Foot	(1)
6.	S/P Ligament Repair	1
7.	S/P Appendectomy	1
8.	S/P Vagotomy	1
9.	S/P Lymph Node Biopsy	1
10.	S/P Exploratory Laporotomy	1
11.	S/P Anterior Urinary Bladder Repair	1
12.	S/P Cholecystectomy	2
13.	S/P Chest Tube Insertion	1
14.	S/P ORIF Fractured Mandible	1

* Indicates post-operative patients.

(n=11) indicated they had worked or volunteered in a health care facility, and 13% (n=5) had attended classes on handwashing.

All of the nursing personnel were employed full-time. Tabulations of descriptive statistics, frequencies and percentages for the demographic data of the employee aggregate and subgroups are offered in Tables 6 and 7. One registered nurse in the sample had taught a patient handwashing class. Patient handwashing instruction offered at the unit level is shown in Tables 8 and 9.

All registered nurses held a baccalaureate or a graduate degree. A Bachelor of Science (BSN) degree was held by 17 (77%) nurses. This unusually high percentage is likely due to the fact that for several years the involved branch of the military has required a BSN for entry into its Nurse Corps. No personnel holding associate degrees or diplomas in nursing were employed on the study units at the time of data collection.

All military medical technicians (n=13) were high school graduates. Seven (54%) had attended college, but no one in the medical technician subgroup had completed a baccalaureate degree.

Findings Related to Research Questions

Research question #1. What are the handwashing practices of ambulatory hospital patients?

The handwashing practices of ambulatory hospital patients were measured at two levels. Field observations

Table 6

Characteristics of the Nursing Personnel Subjects (n=35)

Variable	Range	Mean	Median	Mode
Age	18-46	29	27	27
Gender		Number	Percent	
Male		9	26	
Female		26	74	
Race				
White		30	86	
Black		2	6	
Other		3	8	
Job Classification				
Registered Nurse		22	63	
Military Medical Technician		13	37	
Highest Level of Education				
High School		6	17	
2 or Less Years of College		7	20	
Undergraduate Degree		19	54	
Graduate Degree		3	9	

Table 7

Characteristics of Subsets of Nursing Personnel Participants

Variable	Registered Nurses (n=22)		Medical Technicians (n=13)	
Age				
Range	23-46		18-27	
Mean	32		23	
Median	32		23	
Mode	40		23,27	
Gender	Number	Percent	Number	Percent
Male	1	5	8	62
Female	21	95	5	38
Race				
White	22	100	8	62
Black	0	0	2	15
Other	0	0	3	23
Highest Level of Education				
High School	0	0	6	46
2 or < Yrs College	0	0	7	54
Bachelor's Degree	19	86	0	0
Graduate Degree	3	14	0	0
Unit of Employment				
Medical	11	50	10	77
Surgical	11	50	3	23

Table 8

Patient Handwashing Instruction at the Unit Level by Personnel Subgroups

Variable	All Nursing Personnel (n=35)				Registered Nurses (n=22)				Medical Technicians (n=13)			
	Yes	(%)	No	(%)	Yes	(%)	No	(%)	Yes	(%)	No	(%)
1. Does your unit offer patient handwashing classes?	5	(14)	30	(86)	2	(9)	20	(91)	3	(23)	10	(77)
2. Does your unit orientation program include patient handwashing?	9	(26)	26	(74)	5	(23)	17	(77)	4	(31)	9	(69)

Table 9

Patient Handwashing Instruction at the Unit Level by Unit Subgroups

Variable	All Personnel (n=35)				Medical Unit Personnel (n=21)				Surgical Unit Personnel (n=14)			
	Yes	(%)	No	(%)	Yes	(%)	No	(%)	Yes	(%)	No	(%)
1. Does your unit offer patient handwashing classes?	5	(14)	30	(86)	5	(24)	16	(76)	1	(7)	13	(93)
2. Does your unit orientation program include patient handwashing?	9	(26)	26	(74)	6	(29)	15	(71)	3	(21)	11	(79)

established the levels of practice actually demonstrated by patients in the hospital environment. Survey by questionnaire identified usual handwashing practices that were self-reported by the patients themselves.

Forty patient handwashings were observed by the researcher. The same patients (n=40) were observed for specific times they failed to wash their hands as well. Of the total number of times incidents (post-toileting; before eating or drinking; before contact with wound, dressings or drainage tubes; after contact with wound, dressings or drainage tubes; and after contact with potentially contaminated fomites) occurred during observation periods (n=180), patient handwashing was practiced 22% of the times indicated. Patients washed their hands 42% of the time indicated by toileting and 11% of the time before tending to self wound care needs. Table 10 offers the rates of handwashing compliance in relation to each of the indicators (five handwashing incidents) for which the ambulatory patient subjects were observed.

The length of the handwashing process demonstrated by each patient was timed by the observer. Patient handwashes ranged from 3 to 30 seconds in length and the mean length equaled 11 seconds. See Table 11 for the median and mode times. Patients used three different agents (soaps) for handwashing: a liquid antimicrobial cleanser (n=30); bar soap (n=6); and no soap (n=4). Table 11 offers a breakdown

Table 10

Total Incidents Observed and Rates of Handwashing Compliance/Noncompliance

Variable	No Handwashing Practiced (n=140)		Handwashing Behaviors Observed (n=40)		Total Number of Incidents Observed (n=180)	
	Number	Percent	Number	Percent	Number	Percent
a. Post-toileting	42	58	30	42	72	40
b. Before eating or drinking.	61	95	3	5	64	36
c. Before contact with wound, dressings or drainage tubes.	8	89	1	11	9	5
d. After contact with wound, dressings or drainage tubes.	15	83	3	17	18	10
e. After contact with potentially contaminated fomites (supplies and equipment).	14	82	3	18	17	9
	140	(78)	40	(22)	180	(100)

Table 11

Handwashing: Time Elapsed and Type of Agent

Variable	Range	Mean	Median	Mode
Length of Handwash (in seconds)	3-30	11	8	8

Type of Agent Used	Frequency	Percent
Liquid Antimicrobial	30	75
Bar Soap	6	15
No Soap	4 *	10

* One patient who failed to use soap had none available for handwashing; the liquid soap dispenser was empty and no bar soap was accessible.

of agents by percentages of patient use. One patient was unable to obtain soap from an empty soap dispenser, and the patient continued the handwashing process without using another soap product.

The actual mechanical process demonstrated by patients was measured using Feldman's 10-step handwashing criteria (Gidley, 1987; Taylor, 1978). Of the 20 possible points which could be assigned to each patient's behaviors, individual scores ranged from 5 to 18 points. The aggregate mean score was 12. Actual patient handwashing behaviors of the group measured a 60% quality level. No patients accumulated 0 or 20 points. Table 12 shows that surgical patients scored the same ($\bar{x}$=12) as the aggregate mean while the medical patients scored slightly higher ($\bar{x}$=13).

The specific handwashing behaviors that were observed among patients are listed by frequencies and percentages in Figure 2. For each step of Feldman's handwashing criteria, behaviors demonstrated by the largest number of patients included:

1. Use of continuously running water to wash (93%).
2. Use of soap with visible lather noted (50%).
3. Positioning of hands parallel with arms so water drained from hands into the sink (70%).
4. Minimal splashing to clothing, walls or floor (50%).
5. Rubbing of hands together vigorously for 10 seconds or longer (45%).

Table 12

Scores of the 10-step Patient Handwashing Observation Criteria

Variable	All Patients (n=40)	Medical Patients (n=20)	Surgical Patients (n=20)
Range	5-18	5-18	5-16
Mean	12	13	12
Median	13	13	13
Mode	14,15	15	14

Note. Possible scores range from 0 to 20 points.

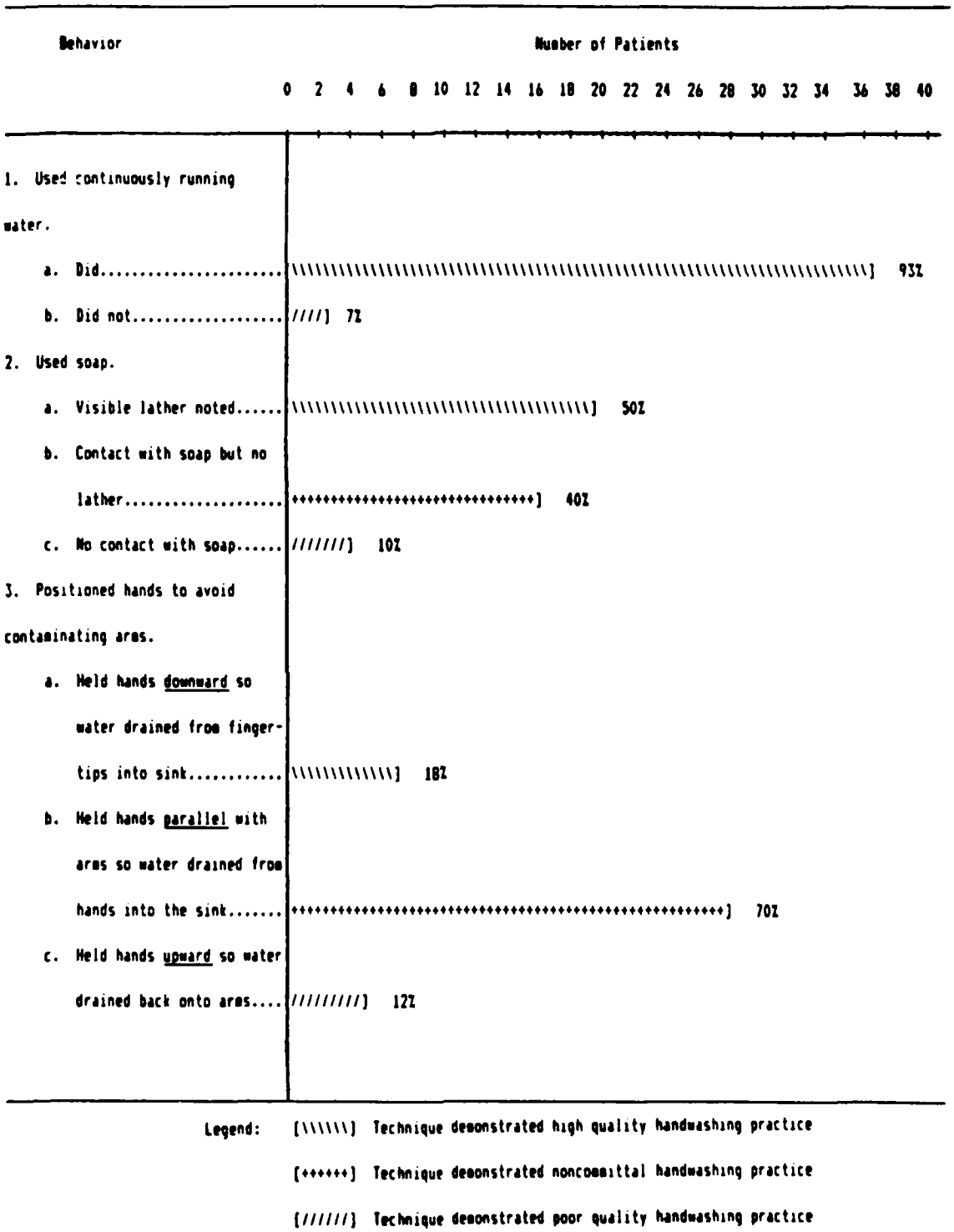


Figure 2. Observed Patient Handwashing Behaviors

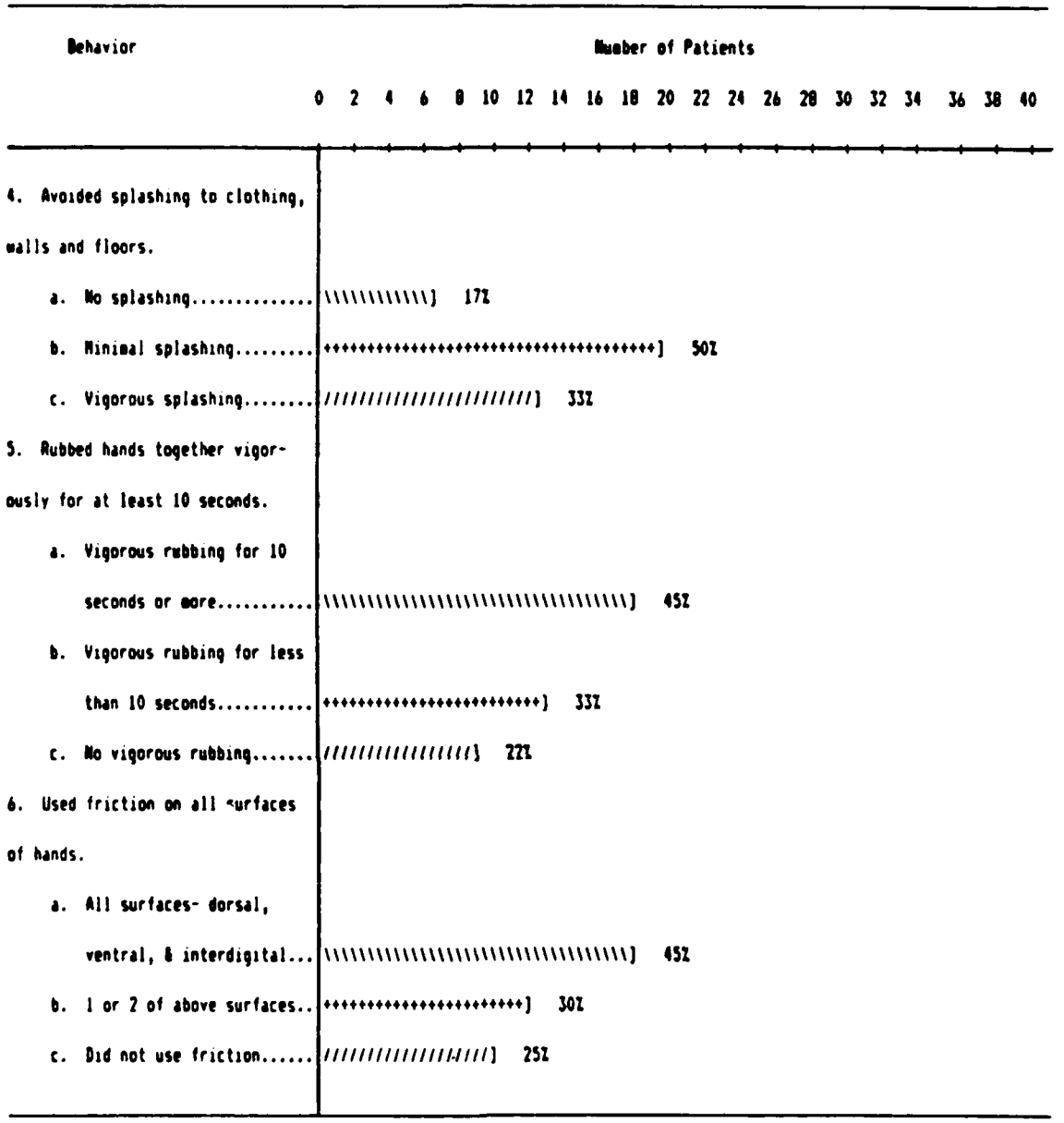


Figure 2. Observed Patient Handwashing Behaviors (Continued)

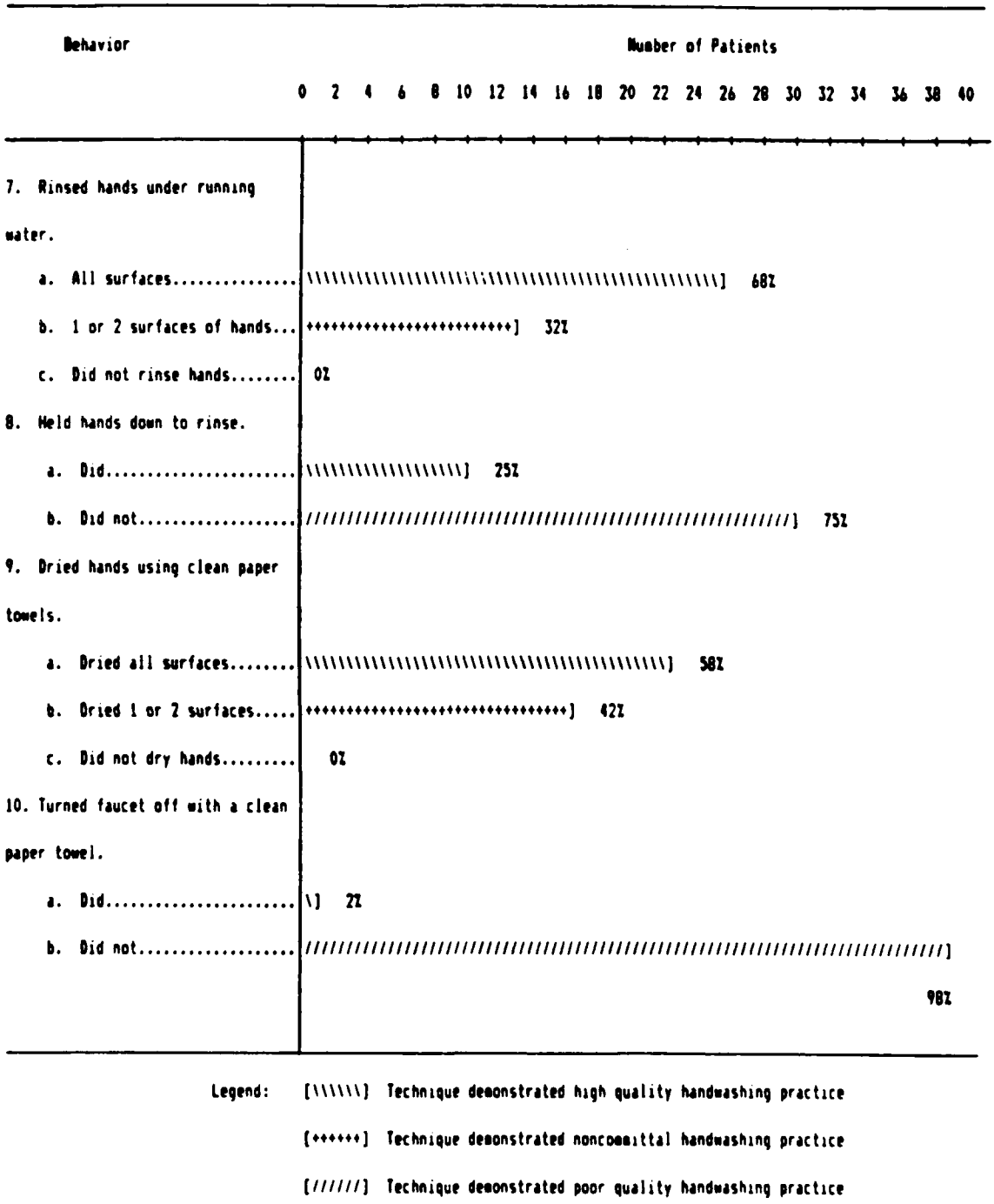


Figure 2. Observed Patient Handwashing Behaviors (Continued)

6. Use of friction to all surfaces of hands (45%).
7. Rinsing of all hand surfaces under running water (68%).
8. Positioning of hands parallel or upward to rinse (75%).
9. Drying all surfaces of hands on clean paper towels (58%).
10. Turning off faucet handle with clean hands or sleeve of clothing (98%).

Half of the patient group failed to use soap effectively. Sixteen patients (40%) made contact with soap but produced no lather; four (10%) used no soap when they washed their hands. In one instance, a liquid soap dispenser was found empty which accounted for one patient's (3%) failure to use soap during handwashing. More than half of the patients (55%) failed to use friction to every surface of their hands or to rub their hands together vigorously for the recommended length of time. One patient (2%), with no history of health care employment, turned the faucet handles off using a clean paper towel.

Incidental behaviors were noted by the researcher as well. One patient performed the handwashing cycle twice during one handwashing experience. Three others (8%) shook the water from their hands before drying them. Three patients (8%) dried their hands on cloth towels rather than using paper towels from the dispenser. Two individuals

wiped off the surface around the sink with the paper towels used for drying their hands.

Survey by questionnaire served as a second method to identify handwashing practices among ambulatory hospital patients. Handwashing practices reported by the patient subjects (n=40) were based on the same criteria used during observation, and were measured by patient responses to statements in Section II of tne Patient Handwashing Survey (Appendix B). Of 75 possible points, individual scores ranged from 39 to 70 points and the mean score was 64 for the patient aggregate. Twenty-two patients scored above the group mean. Reported usual practice was at an average rate of 85% of the quality level recommended by Feldman for effective handwashing practice. Table 13 shows that surgical patient reports resulted in higher scores ($\bar{x}$=66) than the aggregate mean while medical patient reports resulted in lower scores ($\bar{x}$=61). These findings were the reverse of those found for observed patient handwashing practices involving the same two subgroups (see Table 12).

Table 14 lists the steps of the handwashing process and the responses of patients regarding the extent of their usual handwashing practices. Responses were based on an "always" to "never" continuum. Mean, median and modal scores for these patient responses are offered. Behaviors that received a combined score of "always" and "usually" at least 75% of the time and had a mean score of 4 or larger were considered accepted practice. The handwashing

Table 13

Scores of Self-reported Patient Handwashing Practices

Variable	All Patients (n=40)	Medical Patients (n=20)	Surgical Patients (n=20)
Range	39-70	39-70	46-70
Mean	64	61	66
Median	64	65	63
Mode	63,70	66	63,70

Note. Possible scores range from 15 to 75 points.

Table 14

Handwashing Practices Stated by Patients (n=40)

Statement of Behavior	Patient Responses					Scores		
	Always 5	Usually 4	Sometimes 3	Hardly Ever 2	Never 1	Mean	Median	Mode
When I wash my hands at the sink, I:								
14. Use running water while I wash.	30 75%	9 23%	0 0%	1 2%	0	5	5	5
15. Use soap until it lathers.	31 78%	5 12%	4 10%	0 0%	0 0%	5	5	5
16. Hold my hands downward into the sink while I wash.	20 50%	12 30%	7 18%	1 2%	0 0%	4	5	5
17. Avoid splashing water outside the sink.	12 30%	19 48%	7 18%	2 5%	0 0%	4	4	4
18. Rub my hands together for at least 10 seconds.	15 38%	16 40%	8 20%	1 2%	0 0%	4	4	4
19. Wash all surfaces of my hands.	19 48%	17 42%	4 10%	0 0%	0 0%	4	4	4
20. Rinse my hands under running water.	28 70%	11 28%	1 2%	0 0%	0 0%	5	5	5
21. Hold my hands downward while rinsing.	17 43%	15 38%	6 15%	1 2%	1 2%	4	4	5
22. Use clean paper towels to dry my hands.	20 50%	12 30%	3 8%	3 8%	2 5%	4	5	5
23. Turn off the faucet with a clean paper towel.	3 8%	2 5%	10 25%	11 28%	14 35%	2	2	1

Table 14 (Continued)

Statement of Behavior	Patient Responses					Scores		
	Always 5	Usually 4	Sometimes 3	Hardly Ever 2	Never 1	Mean	Median	Mode
When I wash my hands at the sink, I:								
24. Apply lotion to clean hands.	2 5%	9 23%	16 40%	7 17%	6 15%	3	3	3
25. At home, I wash my hands after using the toilet.	26 65%	13 33%	0 0%	1 2%	0 0%	5	5	5
26. In the hospital, I wash my hands after using the toilet.	34 85%	4 10%	1 2%	0 0%	1 2%	5	5	5
27. I wash my hands as frequently in the hospital as I would if I were well and at home.	20 50%	13 33%	1 2%	5 13%	1 2%	4	4	5
28. When I am a patient, I expect the nursing staff to wash their hands before caring for me.	28 70%	9 23%	2 5%	1 2%	0 0%	5	5	5

behaviors most often stated as usual practice among patients included:

1. Use of running water to wash (98%).
2. Use of soap until it lathers (90%).
3. Positioning hands downward into the sink while washing (80%).
4. Avoidance of splashing water outside of sink (78%).
5. Rubbing hands together for at least 10 seconds (78%).
6. Washing all surfaces of the hands (90%).
7. Rinsing hands under running water (98%).
8. Holding hands downward while rinsing (80%).
9. Using clean paper towels to dry hands (80%).

Respondents disregarded item # 23 (turning off the faucet with a clean paper towel) as an important aspect of patient handwashing practice. The mean score for this behavior was 2 and only 12% of the participants answered that they turned off faucet handles with paper toweling.

Patients identified post-toileting handwashing as an important practice, both at home (98%) and in the hospital (95%). The majority of patients (83%) stated they practice handwashing as frequently in the hospital as they would if they were at home. More than 90% of the patients stated that nursing personnel should wash their hands before and after caring for patients.

Research question # 2. What is the knowledge level of patients regarding handwashing?

The knowledge level of patients regarding handwashing in hospitals was measured by Section III of the Patient Handwashing Survey (Appendix B). Of 16 possible points, knowledge scores ranged from 12 to 16 points and the mean score was 15 for the patient aggregate. Twenty-eight patients (70%) scored above the group mean. Table 15 shows the mean scores for the medical and surgical patient subgroups; both demonstrated handwashing knowledge at the same level as that of the total patient group. The median and modal scores were 16 for each subgroup and for the patient aggregate.

The patient subjects (n=40) indicated their levels of knowledge regarding handwashing facts by responding either "True" or "False" to eight declarative statements. Table 16 shows the rates of correct and incorrect responses which were identified by patients. The mode for each response equaled 2. A minimum of 33 correct responses (82%) were indicated for every handwashing fact. All patients stated they are capable of contributing to their own nosocomial infections and that handwashing among patients and health care workers can prevent the danger of cross-infections in hospitals.

Six facts achieved less than perfect response rates. Thirty-nine patients (98%) identified handwashing as a way patients can prevent hospital-acquired infections.

Table 15

Scores of Patient Knowledge Regarding Handwashing in Hospitals

Variable	All Patients (n=40)	Medical Patients (n=20)	Surgical Patients (n=20)
Range	12-16	12-16	14-16
Mean	15	15	15
Median	16	16	16
Mode	16	16	16

Note. Possible scores range from 0 to 16 points.

Table 16

Self-reported Knowledge Levels of Patients Regarding Handwashing in Hospitals

Variable / Handwashing Fact	Patient Responses (n= 40)			
	Correct Responses		Incorrect Responses	
	Number	Percent	Number	Percent
To reduce the risk of infection, it is important for hospitalized patients to wash their hands:				
29. After going to the toilet.	39	98	1	2
30. Before eating or drinking.	35	88	5	12
31. Before contact with their wounds, dressings or drainage tubes.	38	95	2	5
32. After contact with their wounds, dressings or wounds.	39	98	1	2
33. After physical contact with supplies and equipment used in patient care delivery.	33	82	7	18
34. Patients are capable of passing germs from one body part to another on dirty hands.	40	100	0	0
35. Handwashing is a way that patients can prevent hospital-acquired infections.	39	98	1	2
36. Handwashing among health care workers can prevent the danger of cross-infections in hospitals.	40	100	0	0

Handwashing after toileting and before and after contact with wounds, dressings or drainage tubes were indicated as the most important times when hospital patients should wash their hands. Handwashing before eating or drinking and after physical contact with supplies and equipment used in patient care delivery were believed the least important times.

Research question # 3. What are the perceptions of patients regarding handwashing in hospitals?

The perceptions of patients regarding handwashing in hospitals was measured by Section I of the Patient Handwashing Survey (Appendix B). Of 65 possible points, perception scores ranged from 38 to 59 points and the mean score was 51 for the patient aggregate. Twenty-three patients (58%) scored above the group mean. Table 17 shows that surgical patients scored lower ($\bar{x}$=50) than the aggregate mean while medical patients scored higher ($\bar{x}$=52). The modal score was 54 for the patient aggregate and for both subgroups.

Patients responded to 13 declarative statements about handwashing in hospitals. Responses were selected from "strongly agree" to "strongly disagree" depending upon how the patients felt or believed about the contents of each statement. Table 18 lists the patient responses by frequencies and percentages. Mean, median and modal scores for each response are also noted in the table. Statements

Table 17

Scores of Patient Perceptions about Handwashing Needs

Variable	All Patients (n=40)	Medical Patients (n=20)	Surgical Patients (n=20)
Range	38-59	39-59	38-56
Mean	51	52	50
Median	52	53	51
Mode	54	54	54

Note. Possible scores range from 13 to 65 points.

Table 18

Characteristics of Patient Perceptions Regarding the Need for Handwashing in Hospitals

Variable	Patient Responses (n=40)						Scores		
	Agree #		Uncertain		Disagree #		Mean	Median	Mode
	Number	Percent	Number	Percent	Number	Percent			
1. Handwashing is a simple task that I take for granted and overlook doing.	16	40	3	7	21	53	3	2	2
2. I feel that handwashing is a low cost way to protect my health.	37	93	0	0	3	7	4	5	5
3. I feel healthier after I wash my hands.	35	88	4	10	1	2	4	4	4
4. Having a sink, soap & towels handy encourages me to wash my hands.	35	88	3	7	2	5	4	4	4
5. I feel that handwashing protects people from passing germs to others.	39	98	1	2	0	0	5	5	5
6. Posted handwashing signs in my hospital room provide the encouragement for me to wash my hands.	24	60	10	25	6	0	4	4	5
7. The importance of washing my hands in the hospital should be explained by the nursing staff.	28	70	6	15	6	15	4	4	4

Table 18 (Continued)

Variable	Patient Responses (n=40)						Scores		
	Agree *		Uncertain		Disagree *		Mean	Median	Mode
	Number	Percent	Number	Percent	Number	Percent			
8. I think too much handwashing causes skin irritation.	3	7	8	20	29	73	2	2	2
9. The nursing staff is too busy to remind patients to wash their hands.	20	50	6	15	14	35	3	4	4
10. Patients don't get their hands dirty in the hospital. ^	36	90	3	8	1	2	4	4	4
11. Handwashing is not as important to my recovery as other aspects of my care. ^	31	78	4	10	5	12	4	4	4
12. It is important that health care workers wash their hands before caring for patients.	40	100	0	0	0	0	5	5	5
13. It is important that health care workers wash their hands after caring for patients.	37	93	2	5	1	2	5	5	5

* The Strongly agree/Agree responses were combined, and the Disagree/Strongly Disagree responses were combined to provide the percentages reported above.

^ Negatively expressed statements (items # 10 and 11) were reverse scored during data analysis.

that received a combined response of "strongly agree" and "agree" for at least 75% of the total patient group and had a mean score of 4 or larger were considered perceptions held by most patients.

Seven perceptions about handwashing were commonly held by the patient aggregate in this study. Commonly held perceptions were noted for the following statements:

1. Handwashing is a low cost way to protect the health of patients.
2. Patients feel healthier after they perform handwashing.
3. Having a sink, soap and towels handy (within reach) encourages patients to wash their hands.
4. Patients feel that handwashing protects people from passing germs to others.
5. Patients get their hands dirty in the hospital.
6. It is important that health care workers wash their hands before caring for patients.
7. It is important that health care workers wash their hands after caring for patients.

There was a perceived lower level of agreement that posted handwashing signs (60%) and explanations about handwashing from the nursing staff (70%) are needed. Half of the patients thought the nursing staff was too busy to remind patients to wash their hands. More than half of the patients (73%) failed to believe handwashing is a cause of skin irritation or that patients overlook handwashing

practice (53%). Handwashing ranked as important to recovery as other aspects of care among 31 patients (78%).

Research question # 4. What are the similarities and differences between knowledge of patients and patient handwashing practices?

Ambulatory hospital patients (n=40) demonstrated knowledge regarding the relationship of handwashing to infection control. All subjects indicated that hospital patients are capable of contributing to their own nosocomial (hospital-acquired) infections and that handwashing among patients and health care workers can prevent the danger of cross-infections in hospitals. Greater than 82% of the patients agreed that the risk of infection among hospitalized patients was lowered when handwashing was accomplished after going to the toilet; before eating or drinking; before and after contact with wounds, dressings or drainage tubes; and after contact with the supplies and equipment used in patient care delivery.

In practice though, patients did not wash their hands at corresponding rates. The patient group (n=40) practiced handwashing only 22% of the total times (n=180) it was indicated during the observation phase of the study. When the patients washed their hands, their rates of compliance ranged from 5% to 42% for each of the total times when handwashing was indicated as an infection control measure. Of the 40 patients who were observed for practice,

post-toileting handwashing was performed most often within the study group (75%) and handwashing before contact with wounds or dressings was performed least often (2%). Table 19 compares patient knowledge levels to actual practices in relation to the five indicators established for handwashing in hospitals. Based on the differences noted in this table, patients knew the importance of washing their hands, but they failed to observe its practice in the hospital environment. There were no similarities between handwashing knowledge and actual practice noted among patient participants.

Research question # 5. What are the similarities and differences between demonstrated behaviors and stated patient handwashing practices?

Feldman's 10-step handwashing criteria were used to measure patient handwashing practices at two levels. First, actual handwashing practices were identified by using the criteria during field observation to monitor the extent of handwashing behaviors which were demonstrated by ambulatory hospital patients. Second, stated or usual practices were identified by the same patients when they responded to Feldman's criteria in Section II of the Patient Handwashing Survey (Appendix B). Survey responses were made based on the extent that patients believed themselves to demonstrate each handwashing behavior listed in the criteria ("always" to "never"). By comparing the data gathered during patient observations to those gathered in Section II of the patient

Table 19

Indications for Handwashing: Self-reported Knowledge Levels and Observed Practices of Patients (n=40)

Variable	Stated Knowledge Level (The correct responses indicated on the survey.) (n=40)		Observed Handwashing Practice (The levels of practice among the patient study group only.) (n=40)	
	Number	Percent	Number	Percent
To reduce the risk of infection, it is important for hospitalized patients to wash their hands:				
29. After going to the toilet.	39	98	30	75
30. Before eating or drinking.	35	88	3	7
31. Before contact with wounds, dressings or drainage tubes.	38	95	1	2
32. After contact with wounds, dressings or drainage tubes.	39	98	3	7
33. After physical contact with supplies and equipment used in patient care delivery.	33	83	3	7

surveys, similarities and differences between demonstrated behaviors and stated patient handwashing practices were recognized. The stated practices and demonstrated practices for each behavior of the 10-step handwashing criteria are listed in Table 20. Data between the two groups (stated behaviors and demonstrated behaviors) which varied 10% or less were reported out as similarities in handwashing practice; greater than 10% were reported as differences.

Similarities were found among four of the 10 handwashing behaviors. Use of continuously running water to wash and rinse hands were stated as usual practices by 39 patients (98%). The same two behaviors were observed in actual practice by at least 37 of the same patients (93%) although the quality of rinsing varied. The drying process was considered another similarity although the behaviors between the two groups varied more than 10%. Thirty-two patients (80%) reported using clean paper towels to dry their hands and 37 patients (93%) were seen drying their hands on paper towels during observation times. Three patients dried their hands on terrycloth towels. All patients dried their hands although only 23 (58%) dried all surfaces.

The final similarity evolved around the use of clean paper toweling to turn off the faucet at the end of the handwashing process. This behavior was stated practice by five patients (13%), and only one patient (2%) was seen

Table 20

Handwashing Practices as Stated and Demonstrated by Ambulatory Hospital Patients (n= 40)

Variable	Stated Practices ‡		Demonstrated Practices		Variation Between Groups
	Number	Percent	Number	Percent	Percent
Use of continuously running water while washing.	39	98	37	93	5
Use of soap until lather is formed.	36	90	20	50	40
Positioning hands downward into sink while washing.	32	80	7	18	62
Avoid splashing water outside of sink.	31	78	7	17	61
Rubbing hands together vigorously for at least 10 seconds.	31	78	18	45	33
Wash (use friction to) all surfaces of the hands.	36	90	18	45	45
Rinse hands under running water.	39	98	40 +	100	2
Position hands downward while rinsing.	32	80	10	25	55
Use clean paper towels to dry hands.	32	80	37	93	13
Turn off faucet with clean paper towel.	5	13	1	2	11

‡ Always & Usually responses were established as accepted practice and were combined to total the percentages above.

+ Patient rinsed at least one or two surfaces of the hands.

performing the task during observation. Thus, Feldman's method for turning off faucet handles with paper toweling was not found an accepted practice among ambulatory hospital patients.

Six differences between stated and demonstrated handwashing practices were uncovered. Use of soap until it lathered was reported as accepted practice by 36 patients (90%), but only half (50%) of the same patients actually performed the behavior. A large portion (40%) of the subject group made contact with soap but rinsed their hands before noticeable lather was produced. The majority of patients (70%) in practice positioned their hands parallel with their arms rather than holding hands downward into the sink as was reported by survey responses (80%). Thirty-one patients (78%) stated they avoided splashing water outside the sink while washing their hands. In reality though, considerable splashing was noted by most patients (82%). Thirty-one respondents (78%) stated their normal practice consisted of rubbing their hands together vigorously for at least 10 seconds, and 36 patients indicated use of friction to wash all hand surfaces. In actual practice, patients were observed to perform these two behaviors only 45% of the time. Thirteen patients (33%) washed their hands for less than 10 seconds, and 10 patients (25%) failed to use enough motion to produce friction to their skin surfaces. Twelve patients (30%) demonstrated washing motions to only one or two surfaces of their hands; attention to cleansing the

interdigital surfaces was ignored. Hand positioning during the process of rinsing also differed between the groups. Thirty-two patients (80%) reported holding their hands downward while rinsing whereas only 10 patients (25%) actually practiced the behavior. Three-quarters of the patients (n=30) held their hands either parallel to the sink or in an upward direction.

Research question # 6. What are the similarities and differences between the knowledge levels stated by patients and the knowledge levels stated by nursing personnel regarding patient handwashing practices?

The knowledge levels of patients were measured by Section III of the Patient Handwashing Survey (Appendix B) as described when answering research question # 2. Refer to Table 16 for the patient responses to handwashing facts. The knowledge levels of nursing personnel were measured by Section III of the Employee Handwashing Survey (Appendix C). Of 26 possible points, knowledge scores ranged from 22 to 26 points and the mean score was 26 for the employee aggregate. Table 21 shows the ranges and measures of central tendency for the personnel on the medical and surgical units. Personnel on both units demonstrated knowledge regarding patient handwashing at the same levels as the total employee group. Table 22 lists knowledge scores for the personnel subsets: registered nurses and military medical technicians. Again, members of each subset demonstrated

Table 21

Scores of Nursing Personnel by Unit Regarding Patient Handwashing Knowledge

Variable	All Personnel (n=35)	Medical Personnel (n=21)	Surgical Personnel (n=14)
Range	22-26	22-26	24-26
Mean	26	25	26
Median	26	26	26
Mode	26	26	26

Note. Possible scores range from 0 to 26 points.

Table 22

Scores of Nursing Personnel Subsets Regarding Patient Handwashing Knowledge

Variable	Total Personnel (n=35)	Registered Nurses (n=22)	Medical Technicians (n=13)
Range	22-26	22-26	22-26
Mean	26	26	25
Median	26	26	26
Mode	26	26	26

Note. Possible scores range from 0 to 26 points.

knowledge regarding patient handwashing at the same levels as the employee aggregate.

The nursing staff members indicated their levels of knowledge regarding handwashing facts by responding "True" or "False" to 13 declarative statements. The four facts that showed a variance in correct responses between the registered nurses and the medical technicians are listed in Table 23. All other results were 100% correct for both subsets.

Of the five times when handwashing is indicated in hospitals, two showed variation in response. Registered nurses answered at a lower rate than technicians regarding the need for handwashing before eating or drinking and after physical contact with supplies and equipment used in patient care delivery. One medical technician failed to correctly identify patient handwashing as a way to prevent the danger of cross-infections in hospitals. The lowest level of knowledge among the personnel group was identified regarding handwashing as a part of the facility's infection control program. One nurse and two technicians failed to know that specific guidelines for handwashing practices were written into the policies and procedures for their facility.

Similarities and differences in knowledge levels between patients and nursing personnel were established by comparing each aggregate's response rates to eight handwashing facts. The correct responses for each group are listed by frequencies and percentages in Table 24.

Table 23

Self-reported Knowledge Levels of Nursing Personnel Regarding Handwashing in Hospitals

Variable (Handwashing Facts)	Employees Reporting Correct Responses ‡					
	Total Personnel (n=35)		Registered Nurse Subset (n=22)		Medical Technician Subset (n=13)	
	Number	Percent	Number	Percent	Number	Percent
To reduce the risk of nosocomial infections, it is important for hospitalized patients to wash their hands:						
35. Before eating or drinking.	34	97	21	95	13	100
38. After physical contact with supplies and equipment used in patient care delivery.	32	91	20	91	12	92
44. This facility's infection control program offers a written policy specific to handwashing practices.	32	91	21	95	11	85
46. Handwashing by patients helps prevent the danger of cross-infections in hospitals.	34	97	22	100	12	92

‡ Lists handwashing facts which received less than perfect (100%) responses or showed variance between personnel.

Table 24

Knowledge Levels Regarding Patient Handwashing as Reported by Ambulatory Hospital Patients and Nursing Personnel

Variable	Correct Responses of Patients (n=40)		Correct Responses of Nursing Personnel (n=35)		Variation Between the Two Groups
	Number	Percent	Number	Percent	Percent
1. To reduce the risk of infection, it is important for patients to wash hands:					
... after going to the toilet.	39	98	35	100	2
... before eating or drinking.	35	88	34	97	9
... before contact with wounds, dressings or drainage tubes.	38	95	35	100	5
... after contact with wounds, dressings or drainage tubes.	39	98	35	100	2
... after physical contact with supplies and equipment used in patient care delivery.	33	83	32	91	8
2. Hospitalized patients are capable of passing germs from one body part to another on dirty hands.	40	100	35	100	0
3. Handwashing is a way that patients can prevent hospital-acquired infections.	39	98	35	100	2
4. Handwashing among health care workers can prevent the danger of cross-infections in hospitals.	40	100	35	100	0

Variations in correct responses between the two groups are noted by percentages as well. Data between the two groups (patients and nursing personnel) which varied 10% or less were reported as similarities in knowledge levels; data which varied greater than 10% were reported as differences.

Similarities in knowledge levels between the groups were identified for all handwashing facts which were assessed. No differences in knowledge levels were identified. Both patients and nursing personnel knew the importance of patient handwashing in relation to each of the five handwashing indicators, although handwashing before eating or drinking and after physical contact with potentially contaminated supplies and equipment received fewer correct responses by members of both groups.

All nursing personnel knew that hospitalized patients are capable of passing germs to other body parts on dirty hands. All participants knew that handwashing among health care workers can prevent the danger of cross-infections in hospitals. All nursing personnel and all but one patient (98%) also knew that handwashing is a way that patients can prevent nosocomial infections.

Research question # 7. What are the similarities and differences between the perception levels stated by patients and the perception levels stated by nursing personnel regarding patient handwashing practices?

The perception levels of patients were measured by

Section I of the Patient Handwashing Survey (Appendix B) and are described in analysis of research question # 3. Refer to Table 18 for the data regarding specific patient perceptions. The perceptions of nursing personnel were measured by Sections I and II of the Employee Handwashing Survey (Appendix C). Responses to items in Section I identified feelings and beliefs of personnel about patient handwashing in general. Responses to Section II signified the levels at which nursing personnel believed actual handwashing behaviors were performed by hospital patients. Each section was scored separately and reported out as perceptions held by nursing personnel.

Of 110 possible points which could be assigned to Section I, perception scores ranged from 63 to 84 points and the mean score was 75 for the employee aggregate. Table 25 shows the breakdown of scores for participants working on the medical and surgical units. Surgical unit and medical unit personnel held perceptions about patient handwashing at the same level as for the employee aggregate.
Similar perceptions were shared by the registered nurses and medical technicians, as shown by the scores for each subset in Table 26.

In Section I, the nursing personnel responded to 22 declarative statements about patient handwashing practices. Responses were selected from "strongly agree" to "strongly disagree" based on how the participants felt about the contents of each statement. The response rates and measures

Table 25

Scores of Nursing Personnel by Unit Regarding Perceptions About Patient Handwashing

Variable	All Personnel (n=35)	Medical Personnel (n=21)	Surgical Personnel (n=14)
Range	63-84	63-84	65-83
Mean	75	75	75
Median	76	76	75
Mode	69,73,74, 75,77	68,73,74,76 77,81,82	69,75,78,80

Note. Possible scores range from 22 to 110 points.

Table 26

Scores of Nursing Personnel Subsets Regarding Perceptions About Patient Handwashing

Variable	Total Personnel (n=35)	Registered Nurses (n=22)	Medical Technicians (n=13)
Range	63-84	63-83	65-84
Mean	75	75	76
Median	76	75	78
Mode	69,73,74 75,77	69,75	78,81

Note. Possible scores range from 22 to 110 points.

of central tendency for each statement are listed in Table 27. Statements that received a combined response of "strongly agree" and "agree" at least 75% of the time and had a mean score of 4 or larger were considered important by most nursing personnel.

Several generalizations about patient handwashing were perceived with high levels of importance by the employee group. All nursing personnel (n=35) identified handwashing as a hygienic practice which should be performed before touching others, and 34 personnel (97%) believed they had a professional responsibility to assist patients in maintaining standards of personal hygiene. All caregivers thought it important practice of nursing personnel to concern themselves with patient handwashing and to remind patients when practice was indicated. Thirty-three participants (94%) identified patient handwashing as a simple but overlooked task which may be influenced by the location of handwashing facilities in hospitals. All nursing personnel implied that hospital patients practice ineffective handwashing.

Employee responses to items in Section II identified the levels of handwashing behavior that nursing personnel believe patients demonstrate in the hospital environment. Of 55 possible points which could be assigned to this section, scores ranged from 22 to 42 points and the mean score was 35 for the personnel aggregate. Table 28 shows

Table 27

Characteristics of Nursing Personnel Perceptions Regarding Patient Handwashing Practices

Variable	Employee Responses (n=35)						Scores		
	Agree #		Uncertain		Disagree #		Mean	Median	Mode
	Number	Percent	Number	Percent	Number	Percent			
1. Handwashing is a simple task that is taken for granted and overlooked among hospitalized patients.	33	94	2	6	0	0	4	4	4
2. Patients feel healthier after they wash their hands.	20	57	13	37	2	6	4	4	3,4
3. The location of handwashing facilities influences whether or not patients wash their hands.	32	91	1	3	2	6	4	4	4
4. Posted handwashing signs in patient rooms encourage patients to wash their hands.	26	74	8	23	1	3	4	4	4
5. Nursing personnel teach patients that handwashing is a necessary function of hospital infection control.	14	40	10	29	11	31	3	3	3
6. Patients don't know that handwashing can prevent infections. ^	15	43	12	34	8	23	3	3	2

Table 27 (Continued)

Variable	Employee Responses (n=35)						Scores		
	Agree #		Uncertain		Disagree #		Mean	Median	Mode
	Number	Percent	Number	Percent	Number	Percent			
7. Patients think that nursing staff is too busy to remind them of handwashing needs.	8	23	23	66	4	11	3	3	3
8. Patients don't believe they are involved with activities that will result in dirty hands. ^	7	20	5	14	23	66	2	2	2
9. Patients think too much handwashing is detrimental to the skin.	11	31	13	38	11	31	3	3	3
10. Handwashing holds a lower level of priority to patients than other aspects of their care.	27	77	3	9	5	14	4	4	4
11. Patients shouldn't need to be reminded to wash their hands. ^	24	69	1	3	10	28	4	4	4
12. Hospitalized patients practice effective handwashing.	0	0	8	23	27	77	2	2	2
13. Nursing personnel have a responsibilitiy to assist patients in maintaining standards of hygiene.	34	97	1	3	0	0	4	4	4

Table 27 (Continued)

Variable	Employee Responses (n=35)						Scores		
	Agree #		Uncertain		Disagree #		Mean	Median	Mode
	Number	Percent	Number	Percent	Number	Percent			
14. It is important that nursing personnel remind patients to wash their hands when its indicated.	35	100	0	0	0	0	4	4	4
15. I think unit staff development/inservice programs sufficiently address the topic of handwashing.	18	52	4	11	13	37	3	4	4
16. Our unit education program sufficiently addresses the topic of patient handwashing.	2	6	7	20	26	74	2	2	2
17. Patients are aware that personnel should wash their hands before delivering health care.	17	49	8	23	10	28	3	3	4
18. It is hygienic to wash hands before touching other people.	35	100	0	0	0	0	5	5	5
19. Patients don't know the importance of handwashing in the hospital environment. ^	5	14	8	23	22	63	3	2	2
20. I think nursing personnel are too busy to remind patients to wash their hands.	12	34	9	26	14	40	3	2	3

Table 27 (Continued)

Variable	Employee Responses (n=35)						Scores		
	Agree ¥		Uncertain		Disagree ¥		Mean	Median	Mode
	Number	Percent	Number	Percent	Number	Percent			
21. Nursing personnel on this unit assist patients relating to their handwashing needs.	11	31	10	29	14	40	3	3	2
22. Patient handwashing is not a worry of mine. ^	31	89	3	8	1	3	4	4	4

¥ The Strongly Agree/Agree responses were combined, and the Disagree/Strongly Disagree responses were combined to provide the percentages reported above.

^ Negatively expressed statements (items # 6, 8, 11, 19 and 22) were reverse scored during data analysis.

Table 28

Scores of Nursing Personnel By Unit Regarding Patient Handwashing Practices

Variable	All Personnel (n=35)	Medical Personnel (n=21)	Surgical Personnel (n=14)
Range	22-42	22-42	29-41
Mean	35	35	34
Median	35	35	35
Mode	35	34,36	35

Note. Possible scores range from 11 to 55 points.

the ranges and measures of central tendency for participants working on the medical and surgical units. Personnel on both units demonstrated perception levels similar to those of the total group. Table 29 lists scores for the personnel subsets. Registered nurses and military medical technicians demonstrated perception levels similar to each other and to those of the total personnel group.

In Section II of the employee survey, the nursing personnel responded to 11 declarative statements regarding patient handwashing behaviors. Responses were selected from "always" to "never" based on the respondents' feelings and beliefs about each statement. Table 30 lists the rates of response and the mean, median and modal scores for each statement in Section II. Statements that received a combined score of "always" and "usually" at least 75% of the time and had a mean score of 4 or larger were considered the handwashing behaviors that nursing personnel perceived patients most likely to demonstrate. Most caregivers believed that hospital patients wash and rinse their hands under running water, and dry their hands on clean paper towels. Nursing personnel identified the remaining seven handwashing criteria as behaviors which are sometimes or hardly ever practiced among ambulatory hospital patients.

Similarities and differences in perception levels between patients and nursing personnel were established by comparing participant responses to 12 criteria in Section I and 10 criteria in Section II of the patient and employee

Table 29

Scores of Nursing Personnel Subsets Regarding Patient Handwashing Practices

Variable	Total Personnel (n=35)	Registered Nurses (n=22)	Medical Technicians (n=13)
Range	22-42	29-41	22-42
Mean	35	34	35
Median	35	34	35
Mode	35	33,34,35	35

Note. Possible scores range from 11 to 55 points.

Table 30

Characteristics of Patient Handwashing Practices as Perceived by Nursing Personnel

Variable	Nursing Personnel Responses (n=35)					Scores		
	Always	Usually	Sometimes	Hardly Ever	Never	Mean	Median	Mode
	5	4	3	2	1			
Most patients who wash their hands at a sink are observed to:								
23. Use running water.	11	19	4	1	0	4	4	4
	32%	54%	11%	3%	0%			
24. Use soap until it lathers.	2	11	20	2	0	3	3	3
	6%	31%	57%	6%	0%			
25. Hold hands downward into sink while washing.	1	12	19	3	0	3	3	3
	3%	34%	54%	9%	0%			
26. Avoid splashing water outside of sink.	0	6	24	5	0	3	3	3
	0%	17%	69%	14%	0%			
27. Rub hands together for at least 10 seconds.	0	6	15	13	1	3	3	3
	0%	17%	43%	37%	3%			
28. Wash all surfaces of the hands.	0	3	20	12	0	3	3	3
	0%	9%	57%	34%	0%			
29. Rinse hands under running water.	5	24	6	0	0	4	4	4
	14%	69%	17%	0%	0%			
30. Hold hands downward while rinsing.	1	12	19	3	0	3	3	3
	3%	34%	54%	9%	0%			

Table 30 (Continued)

Variable	Nursing Personnel Responses (n=35)					Scores		
	Always	Usually	Sometimes	Hardly Ever	Never	Mean	Median	Mode
	5	4	3	2	1			
31. Use clean paper towels to dry their hands.	11 31%	19 54%	3 9%	2 6%	0	4	4	4
32. Turn off the water faucet with a clean paper towel.	0 0%	0 0%	3 9%	19 54%	13 37%	2	2	2
33. Apply lotion to clean hands.	0 0%	1 3%	13 37%	15 43%	6 17%	2	2	2

surveys. The perception levels reported by both groups and levels of variation between the groups are listed in Table 31. Data comparisons between the two groups (patients and nursing personnel) which varied 10% or less were reported as similarities in perception levels; data which varied greater than 10% were reported as differences.

Two similarities were noted between the study groups. First, both patients and nursing personnel believed that access to handwashing facilities influences whether or not patients wash their hands in the hospital environment. Greater than 85% of both groups said that having a sink, soap and towels handy (within reach) encourages patients to wash their hands. The second perception shared by both groups was in the practice of hand drying. Most respondents believed that patients who wash their hands at a sink use clean paper towels for hand drying.

Differences in perceptions between the two aggregates were numerous. Four variables were perceived more important by the personnel group. Greater than 90% of the nursing personnel stated that handwashing is a simple task and is overlooked by hospital patients; only 40% of the patient participants agreed. Twenty-six personnel (74%) believed that posted handwashing signs encourage patients to wash their hands; 60% of the patients agreed. All nursing personnel concurred in that the importance of patient handwashing should be explained by the nursing staff to

Table 31

Perception Levels About Patient Handwashing as Reported by Ambulatory Hospital Patients and Nursing Personnel

Variable	Respondents in Agreement with Statements *				
	Patients (n=40)		Nursing Personnel (n=35)		Level of Variation
	Number	Percent	Number	Percent	Percent
1. Handwashing is a simple task that is taken for granted and overlooked by hospital patients.	16	40	33	94	54
2. Patients feel (know) that handwashing is a low cost way to protect their health.	37	93	8	23	70
3. Patients feel healthier after they wash their hands.	35	88	20	57	31
4. Having a sink, soap & towels handy (within reach) encourages patients to wash their hands.	35	88	32	91	3
5. Patients feel that handwashing protects people from passing germs to others. *	39	98	8	23	75
6. Posted handwashing signs in patient rooms encourage patients to wash hands.	24	60	26	74	14
7. The importance of patient handwashing in hospitals should be explained by the nursing staff.	28	70	35	100	30

Table 31 (Continued)

Variable	Respondents in Agreements with the Statements				
	Patients (n=40)		Nursing Personnel (n=35)		Level of Variation
	Number	Percent	Number	Percent	Percent
8. Patients think too much handwashing causes skin irritation.	3	7	11	31	24
9. The nursing staff is too busy to remind patients to wash their hands.	20	50	8	23	27
10. Patients believe they are involved in activities in the hospital which result in dirty hands. *	36	90	7	20	70
11. Handwashing is as important to recovery as other aspects of patient care. *	31	78	5	14	64
12. Patients are aware that health care workers should wash their hands before and after caring for patients.	40	100	16	46	54
13. Patients who was their hands at a sink*:					
... use running water to wash.	39	98	30	86	12
... use soap until it lathers.	36	90	13	37	53

Table 31 (Continued)

Variable	Respondents in Agreement with Statements ¥				
	Patients (n=40)		Nursing Personnel (n=35)		Level of Variation
	Number	Percent	Number	Percent	Percent
... hold hands downward while washing.	32	80	13	37	43
... avoid splashing water outside sink.	31	78	6	17	61
... rub hands together for at least 10 seconds.	31	78	6	17	61
... wash all surfaces of their hands.	36	90	3	9	81
... rinse hands under running water.	39	98	29	83	15
... hold hands downward while rinsing.	32	80	13	37	43
... dry hands using a clean paper towel.	32	80	30	86	6
... turn off faucet handle with a clean paper towel.	5	13	0	0	13
... apply lotion to clean hands.	11	28	1	3	25

¥ Negatively expressed statements (items # 5, 10 and 11) were reverse scored and rephrased positively for purposes of table presentation.

patients; 70% o the patient population thought this practice was n essary. While both groups discounted skin irritation as a omplication of frequent handwashing, a higher number of personnel (31%) thought patients were concerned about skin irritation caused by too much handwashing; only three patients (8%) verbalized this as a concern.

Patients perceived other aspects of their handwashing practices to be at higher levels than was perceived by nursing personnel. Patients (90%) believed their participation in hospital activities contributed to dirty hands; only 20% of nursing personnel thought patients felt that way. Greater than three-quarters of the polled patients (78%) identified their handwashing as being equally as important to their recovery as other aspects of their care; 14% of the nursing personnel identified this perception as held by patients. Additionally, all patients indicated that health care workers should practice handwashing before and after caring for patients. Less than half (46%) of the personnel thought patients were aware of handwashing needs among caregivers. Half of the patients indicated that nursing staff are too busy to remind patients to wash their hands; 23% of the nursing personnel thought patients felt this way. Patients held higher perceptions than nursing personnel regarding actual handwashing behaviors that are practiced by hospital patients. For every step of Feldman's criteria, except drying, the patient

group identified higher levels of handwashing practice among patients than did the employee group. Refer to Table 31 for response rates for each criteria.

Summary

In this chapter, data analysis was discussed for the patient handwashing study. Two primary study samples were described: ambulatory hospital patients and nursing personnel who cared for those patients. The response rates to survey distribution were 100% for patients and 64% for nursing personnel. After data were analyzed for the field observations and patient/employee survey responses, study findings were related to each of the seven research questions. Actual and stated handwashing practices of ambulatory hospital patients were described. Knowledge and perception levels of patients and nursing personnel regarding patient handwashing practices were identified. Many similarities and differences regarding handwashing practices, knowledge and perceptions between the two study groups were found.

CHAPTER 5: DISCUSSION, CONCLUSIONS, LIMITATIONS, IMPLICATIONS AND RECOMMENDATIONS

Introduction

This chapter concludes the study with a discussion of the findings, followed by conclusions drawn from them. The implications of the findings for nursing will be discussed, and recommendations for further study will be made. Observations about the experience of conducting the study will be related. Finally, a summary will be presented.

Discussion

In recent years, infection control experts have conducted numerous research studies specific to handwashing practices. Principles of handwashing have been established and many issues surrounding the subject have been resolved. Most importantly, substantial research has promoted handwashing by hospital employees as an inexpensive, easy and effective method of nosocomial disease prevention among hospital patients. Despite extensive research though, other issues regarding handwashing still need resolution. The controversy of which "soap" is best to use during patient care delivery remains unresolved. Specifications as to which levels of patient contact necessitate handwashing remain in question. In most instances, attempts have failed in trying to identify motivators for improving handwashing

compliance in hospitals. Specific reference to patient handwashing and its probable affect on the spread of microbes in health care facilities have been barely investigated or even ignored (Larson, 1988; Lawrence, 1983; Pritchard, 1987).

The personal experience of this researcher as a medical/surgical staff nurse and as an infection control surveillance officer have informally identified that hospital patients disregard their personal hygiene practices (especially handwashing) while occupying the sick role. Past observations have shown that patients fail to wash their hands in relation to the five indicators listed by the CDC (Garner & Favero, 1986). Because pathogenic microbes are present in human body substances (excreta), the lack of patient handwashing may contribute to the transfer of organisms to compromised body sites and result in hospital-acquired infections.

Because of lack of documentation on the topic of patient handwashing, this descriptive study was done to generate data and to serve as a baseline for future studies. The purpose of the study was two-fold: to determine the levels at which hospital patients perform handwashing and to assess both patient and employee knowledge and perceptions about patient handwashing practices. Observational field study and survey by questionnaire served as the methods for data collection.

In this study, patient handwashing practices were identified at two levels. Actual practices were the handwashing behaviors demonstrated by patients during observation times (n=180), and perceived usual practices were those stated by patients in terms of survey responses (n=40). Overall, the quantity and quality of actual patient handwashing practices were demonstrated at rates less than perceived usual practices were reported by the same patients. In practice, actual handwashings were noted only 22% of the total number of times handwashing was indicated for ambulatory patients. Patients reported a higher incidence for perceived usual practice although no statements in the patient survey measured stated compliance rates. Patients were observed washing their hands most often after toileting and least often before performing self wound care.

The quality of patient handwashing was measured using Feldman's 10-step handwashing criteria as the recommended guidelines for effective practice. Whether or not this criteria is considered too detailed and unrealistic a process for patient use remains unanswered among infection control circles. Because these steps constitute effective practice among health care workers, they were assumed good guidelines to apply to patients as well. Findings indicated that a lower quality handwashing process (60%) was found in actual practice than was reported by patients as perceived usual practice (85%). Patients on the medical unit

practiced handwashing at a slightly higher level ($\bar{x}$=13) than patients on the surgical unit ($\bar{x}$=12). Patients reported more frequent and more effective handwashing for themselves than nursing personnel reported for hospital patients.

Of the 40 patients who were observed for actual handwashing, the majority demonstrated acceptable behaviors for five of Feldman's criteria. Positioning hands downward while washing and rinsing to prevent contamination of arms, avoidance of splashing water outside sink, attention to washing all hand surfaces, and turning off the faucet with clean paper toweling were not practiced by most patients. The handwashing process most often demonstrated by ambulatory patients included:

1. Use of continuously running water to wash hands.
2. Use of soap until a visible lather was formed.
3. Positioning of hands parallel with arms so water drained from the hands into the sink.
4. Minimal or vigorous splashing to clothing, walls and floor.
5. Rubbing hands together vigorously for at least 10 seconds.
6. Use of friction to one or two, but not all, surfaces of the hands.
7. Rinsing all surfaces of hands under running water.
8. Positioning hands parallel or upward while rinsing.
9. Drying of hands with clean paper toweling.

10. Turning off the faucet handle with clean hands or the sleeve of clothing.

Actual patient handwashings lasted an average of 11 seconds and different levels (types and amounts) of soap were applied during the handwashing process. Most often, liquid soap was used because it was most readily available to patients at the time. Those patients who had access to bar soap, used it for handwashing. Four patients failed to use soap at all.

In this study, handwashing knowledge levels were established for both ambulatory hospital patients and nursing personnel caring for those patients. Patients responded to eight handwashing facts with 95% accuracy and similar knowledge levels were identified for both patient subgroups. At least 98% of the time, patients knew the importance of handwashing to hospital infection control, and greater than 80% of the ambulatory patients correctly identified the five most important times to wash hands in hospitals.

Nursing personnel responded to 13 handwashing facts with 98% accuracy. Knowledge levels between the professional subgroups (registered nurses and military medical technicians) and the unit subgroups (medical unit and surgical unit) were assessed; no major differences were found. Clearly, the nursing personnel realized the importance of handwashing and knew the five critical times to accomplish handwashing in hospitals. All personnel

identified handwashing among themselves and patients as a means to prevent infections.

Patient and personnel knowledge levels were compared to each other and to patient handwashing practices. Similarities and differences were noted. The overall knowledge level of patients closely paralleled that of nursing personnel regarding handwashing facts. Although patients and personnel held high levels of knowledge regarding the importance of handwashing in controlling infections, patient handwashing was practiced poorly (demonstrating only five of ten components of the handwashing process and washing hands less than 25% of the times indicated).

An understanding of perceptions about patient handwashing resulted from this study, as well. Findings indicated that perceptions held by patients about their own handwashing practices closely paralleled the perceptions regarding patient handwashing reported by nursing personnel with respect to the need for handwashing and its importance to infection control. Both groups considered patient handwashing an important practice in hospitals but at a slightly lower level than the handwashing practices prescribed by the CDC for caregivers. Patients and nursing personnel shared the beliefs that access to handwashing facilities and posted handwashing reminders influence whether or not patients wash their hands.

Differences were noted in how each group (patients and nursing personnel) perceived levels of actual handwashing practices among hospital patients. The patients felt they practiced handwashing appropriately and at a much higher quality than nursing personnel thought. Nursing personnel indicated that most patients ignore handwashing even though it is a simple task. Half of the patients believed members of the nursing staff were too busy to worry about patient handwashing or to remind patients to wash their hands. In contrast though, personnel thought patient handwashing instruction and reinforcement of practice is a nursing responsibility.

Conclusions

The studies by Lawrence (1983) and Pritchard (1987) were the only accounts revealed in which findings about patient handwashing resembled the results of this study. In her published account, Lawrence (1983) merely surveyed hospital patients to determine whether or not they washed their hands. Handwashing noncompliance was identified for reasons of poor motivation, limited mobility, inadequate handwashing facilities and no opportunity to wash.

Pritchard's (1987) unpublished post-toileting handwashing study identified poor patient compliance as well, especially among nonambulatory patients. Her findings indicated that mobility status largely contributed to the levels at which patients washed their hands. Although her study was limited to assessing post-toileting handwashing

practices, Pritchard expanded earlier studies by examining relationships between handwashing knowledge, perceptions and behaviors. Pritchard's study uncovered a paradox in that patients stated a high degree of knowledge about patient handwashing importance, but they did not consistently practice post-toileting handwashing. Also nurses demonstrated a high degree of knowledge and positive perceptions, but they failed to assist patients with handwashing needs.

In this study, patient handwashing practices were assessed beyond the scopes of the two earlier studies. The composition of the field setting differed and the samples were larger. The patient sample was limited to those having ambulatory mobility status and the employee sample was expanded to include all levels of nursing personnel. Original data collection tools were used. Despite these changes in methodology, many of the study findings paralleled those of the Lawrence and Pritchard studies, however new data were generated regarding practice, knowledge and perceptions about patient handwashing. Patterns of actual handwashing practice among ambulatory hospital patients were defined. Although several new findings of this study are inconclusive, they lay groundwork for future research on patient handwashing.

Limitations

Generalizations about this study's findings cannot be made for several reasons. The peculiarities of the setting (one military medical center) and the sampling (exclusion of nonambulatory patients; inclusion of military medical technicians) make it unique among documented studies of patient handwashing studies. Although observations were meant to be inconspicuous for the identification of unbiased patient handwashing behaviors, the researcher's presence on the study units during additional phases of data collection probably affected the study findings. Inconsistent placement of handwashing facilities limited the quantity and quality of patient observations. The researcher's personal contact with participants during data collection (assistance with instructions and survey completion; verbal feedback and patient education offerings) probably influenced the responses gathered regarding practice, perceptions and knowledge about patient handwashing.

Use of only one data collector contributed to limited experimenter effect, especially during the observation phase of the study. Limitations of the methodology in Chapter 3 cannot be ignored. Use of original data collection tools which had very limited reliability testing was a study limitation. Extensive statistical analysis of data is likely to yield more definitive findings than the descriptive similarities and differences identified by this researcher. Replication of the study is encouraged.

Implications for Nursing Practice

Current handwashing theories fail to show the significance of patient handwashing to the control of infections in hospitals. By incorporating patient handwashing into a handwashing conceptual model (Pritchard, 1987), health care workers can better appreciate that patient handwashing is largely absent from current practice because there is poor nursing intervention for teaching and reminding, even though there is perceived benefit of handwashing performance noted on the part of patients and nursing personnel. The importance of patient handwashing should be stressed in all patient care settings, and these findings should be shared with nurse educators so information regarding patient handwashing can be incorporated into staff development and patient education programs.

The primary study assumption was that patient handwashing is a desirable behavior. The inconsistency between the high knowledge/perception levels held by nursing personnel and patients that patient handwashing is important and the low level of actual handwashing practice, is cause for nursing concern. Surely, nursing personnel and infection control leaders need to be aware of this gap between patient knowledge and action. Patient education is a must and should be instituted on personal and unit levels. Basic patient handwashing instruction should be a part of

unit orientation (admission) programs and should be reemphasized when patients are given self wound care instructions.

At the facility level, infection control leaders and plant managers can contribute to improved handwashing compliance among hospital patients. Infection control nurses must incorporate patient handwashing into their facility programs, the same way as employee handwashing is addressed. Criteria for patient handwashing practices should be written into policies/procedures and structured handwashing classes should be taught. All patients require orientation to hospital infection control so they can become aware of their responsibilities in their own disease prevention. The plant manager and housekeeping personnel can contribute to improved handwashing by providing adequate handwashing facilities for patients and personnel. Readily accessible sinks, along with well stocked soap and paper towel dispensers, provide an environment more conducive to handwashing than if the items were not available for use.

Returning to the operational study model (Figure 1), the findings suggest that high levels of handwashing knowledge and perceptions regarding the importance of patient handwashing practices have little actual bearing on whether or not hospital patients will wash their hands. Perhaps patients genuinely perceive little risk or vulnerability to disease from lack of handwashing, as was demonstrated in Pritchard's (1987) post-toileting

handwashing study.

Since the problem of poor patient handwashing practices are solidly based in clinical nursing, plans to resolve the problem need to be addressed to advance nursing practice. Through careful assessment of patient handwashing behaviors and future education of the impact of handwashing on infection control, patients and nursing personnel can work together to improve motivation and compliance involving all aspects of handwashing in hospitals. For this to happen, concentrated efforts to improve handwashing practices must be made at personal, unit and facility levels.

Recommendations for Further Study

Although employee handwashing is repeatedly documented as a method of infection control, the effects of patient handwashing require further study. Future researchers should consider studying the Patient Handwashing Model (Figure 1) more extensively to generate additional information specific to patient handwashing. Researchers should replicate this study to lend reliability to its findings, or design other studies that include patient handwashing utilizing the handwashing model. The following inquiries are suggested topics for further research regarding patient handwashing:

1. What are the incidents that prompt handwashing among nonambulatory patients?

2. What are the handwashing practices of nonambulatory hospital patients?

3. What is the relationship between handwashing practices demonstrated by ambulatory patients and those demonstrated by nonambulatory patients?

4. What are the pathogenic microbes found on the hands of hospital patients?

5. What are the steps of the handwashing process that constitutes effective handwashing among hospital patients?

6. What are the handwashing agents (soaps) most often used by hospital patients?

7. What handwashing alternatives are offered to patients who are unable to wash their hands at a sink?

8. What is the relationship between levels of patient and staff handwashing instruction and actual patient handwashing practices in hospitals?

9. What is the relationship between the level of handwashing demonstrated by hospital patients and the level of handwashing demonstrated by the nursing personnel who care for those patients?

Experiential Observations

Generally, participation in the study was an enjoyable and sought-after experience. Patients particularly seemed to be pleased that their input was sought regarding a practice as basic as personal hygiene. Feedback regarding the quality of their handwashing behaviors was readily accepted by most patients, and patient accessibility to

instructional media on the topic of handwashing was welcomed. Few comments about the study were received from nursing personnel despite their indications that patient handwashing behaviors are practiced poorly and that the topic deserves further investigation.

Manual statistical analysis proved to be a mixed blessing. It facilitated greater intimacy with the study and the data involved than could have been provided by any other means. Having all raw data and a handwritten record of every computation provides possibilities for returning to the data later and asking new questions with a different perspective. On the other hand, it was a daunting experience in terms of organization, time and patience. The large amounts of time it took to manually analyze the research data cannot be overlooked.

Summary

In this chapter the findings of the patient handwashing study were discussed in terms of their similarities and differences and their implications for nursing. Topics of inquiry were suggested for further research, and the researcher offered observations based on the experience the study provided.

Appendix A:

Patient Handwashing Observation Checklist

Appendix A

Patient Handwashing Observation Checklist

Patient Demographics:

ID #:_____ Age:_____ Sex: Male Female

Date:_____ Race: White Black Other

Admission Diagnosis:_____ Service: Medical Surgical

Length of Patient Handwash:_____seconds Type of Agent Used:_____

I. The incident leading up to the observed handwashing behavior: (Check the appropriate response.)
- [ ] a. Post-toileting.
- [ ] b. Before eating/drinking.
- [ ] c. Before contact with wound, dressing, or drainage tubes.
- [ ] d. After contact with wound, dressing, or drainage tubes.
- [ ] e. After contact with potentially contaminated fomites (supplies, equipment).

II. Evaluation criteria for observing handwashing behaviors of ambulatory patients. (Check one response for each demonstrated behavior.)

(a) Used continuously running water.
- [ ] 2 Did.
- [ ] 0 Did not.

(b) Used soap.
- [ ] 2 Visible lather noted.
- [ ] 1 Contact with soap but no lather.
- [ ] 0 No contact with soap.

(c) Positioned hands to avoid contaminating arms.
- [ ] 2 Held hands <u>downward</u> so that water drained from fingertips into sink.
- [ ] 1 Held hands <u>parallel</u> with arms so that water drained from hands into sink.
- [ ] 0 Held hands <u>upward</u> so that water drained back onto arms.

(d) Avoided splashing to clothing, walls, and floor.
- [ ] 2 No splashing.
- [ ] 1 Minimal splashing.
- [ ] 0 Vigorous splashing.

(e) Rubbed hands together vigorously for at least 10 seconds.
- [ ] 2 Vigorous rubbing for 10 seconds.
- [ ] 1 Vigorous rubbing for less than 10 seconds.
- [ ] 0 No vigorous rubbing.

(f) Used friction on all surfaces of hands.
- [ ] 2 All surfaces- dorsal, ventral, and interdigital.
- [ ] 1 One or two of above surfaces.
- [ ] 0 Did not use friction.

(g) Rinsed hands under running water.
- [ ] 2 All surfaces- dorsal, ventral, and interdigital.
- [ ] 1 One or two of above surfaces.
- [ ] 0 Did not rinse hands.

(h) Held hands down to rinse.
- [ ] 2 Did.
- [ ] 0 Did not.

(i) Dried hands using clean paper towels.
- [ ] 2 Dried all surfaces.
- [ ] 1 Dried one or two surfaces.
- [ ] 0 Did not dry hands.

(j) Turned faucet off with clean paper towel.
- [ ] 2 Did.
- [ ] 0 Did not.

III. Anecdotal Notes:

Appendix B:

Patient Handwashing Survey

Appendix B

Patient Handwashing Survey

Patient Characteristics:

Age:_____ **Level of Education:**_____

Current Job:_____

Have you ever worked in a health care facility?_____

Have you ever attended classes on handwashing?_____

I. The following statements are comments on handwashing. Please respond to each of the statements by checking the response which most closely agrees with how you feel about the statement.

Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
1. Handwashing is a simple task that I take so much for granted that I overlook doing it.					
2. I feel that handwashing is a low cost way to protect my health.					
3. I feel healthier after I wash my hands.					
4. Having a sink, soap, and towels handy (within reach) encourages me to wash my hands.					
5. I feel that handwashing protects people from passing germs to others.					
6. Posted handwashing signs in my hospital room provide the encouragement for me to wash my hands.					
7. The importance of washing my hands in the hospital should be explained by the nursing staff.					
8. I think too much handwashing causes skin irritation.					

Appendix B (COntinued)

Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
9. The nursing staff is too busy to remind patients to wash their hands.					
10. Patients don't get their hands dirt, in the hospital.					
11. Handwashing is not as important to my recovery as other aspects of my care.					
12. It is important that health care workers wash their hands before caring for patients.					
13. It is important that health care workers wash their hands after caring for patients.					

II. Each of the next statements addresses the way that you do handwashing. Please check a response to each comment based on the handwashing behaviors you think you demonstrate, both here in the hospital and at home.

Statement	Always 5	Usually 4	Sometimes 3	Hardly Ever 2	Never 1
When I <u>wash</u> my hands at the sink, I:					
14. Use running water while I wash.					
15. Use soap until it lathers.					
16. Hold my hands downward into the sink while I <u>wash</u>.					
17. Avoid splashing water outside the sink.					
18. Rub my hands together for at least 10 seconds.					

Appendix B (Continued)

Statement	Always 5	Usually 4	Sometimes 3	Hardly Ever 2	Never 1
When I wash my hands at the sink, I:					
19. wash all surfaces of hands					
20. Rinse my hands under running water.					
21. Hold my hands downward while rinsing.					
22. Use clean paper towels to dry my hands.					
23. Turn off the faucet with a clean paper towel.					
24. Apply lotion to clean hands.					
25. At home, I wash my hands after using the toilet.					
26. In the hospital, I wash my hands after using the toilet.					
27. I wash my hands as frequently in the hospital as I would if I were well and at home.					
28. When I am a patient, I expect the nursing staff to wash their hands before caring for me.					

III. The last statements are based on facts about handwashing in hospitals. Please check TRUE or FALSE to indicate your level of understandng of each comment noted below.

Statement	TRUE 2	FALSE 0
To reduce the risk of infection, it is important for hospitalized patients to wash their hands:		
29. After going to the toilet.		

Appendix B (Continued)

Statement	TRUE 2	FALSE 0
To reduce the risk of infection, it is important for hospitalized patients to wash their hands: 30. Before eating or drinking.		
31. Before contact with their wounds, dressings, or drainage tubes.		
32. After contact with their wounds, dressings, or drainage tubes.		
33. After physical contact with supplies and equipment used in patient care delivery.		
34. Patients are capable of passing germs from one body part to another on dirty hands.		
35. Handwashing is a way that patients can prevent hospital-acquired infections.		
36. Handwashing among health care workers can prevent the danger of cross-infections in hospitals.		

THANK YOU FOR YOUR WILLINGNESS TO PARTICIPATE IN THIS STUDY!

Appendix C:

Employee Handwashing Survey

Appendix C

Employee Handwashing Survey

Demographics:

Code#:_____ Age:_____ Sex: Male Female

Race: White Black Other

Educational Level:_____

Credentials: RN LPN/LVN Medical Technician

Have you ever taught a patient handwashing class? _____

Does your unit offer patient handwashing classes?_____

Does unit orientation include patient handwashing?_____

I. The following statements are comments on handwashing. Please respond to each of the statements by checking the response which most closely agrees with how you feel about the statement.

Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
1. Handwashing is a simple task that is taken for granted and overlooked among hospitalized patients.					
2. Patients feel healthier after they wash their hands.					
3. The location of handwashing facilities influences whether or not patients wash their hands.					
4. Posted handwashing signs in patient rooms encourage patients to wash their hands.					
5. Nursing personnel teach patients that handwashing is a necessary function of hospital infection control.					
6. Patients don't know that handwashing can prevent infections					

Appendix C (Continued)

Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
7. Patients think the nursing staff is too busy to remind them of handwashing needs.					
8. Patients don't believe they are involved with activities that will result in dirty hands.					
9. Patients think too much handwashing is detrimental to the skin (drying, chafing, cracking).					
10. Handwashing holds a lower level of priority to patients than other aspects of their care.					
11. Patients shouldn't need to be reminded to wash their hands.					
12. Hospitalized patients practice effective handwashing.					
13. Nursing personnel have a responsibility to assist patients in maintaining standards of hygiene.					
14. It is important that nursing personnel remind patients to wash their hands when it is indicated.					
15. I think unit staff development/ inservice programs sufficiently address the topic of handwashing.					
16. Our unit patient education program sufficiently addresses the topic of patient handwashing.					
17. Patients are aware that personnel should wash hands before delivering health care.					
18. It is hygienic to wash hands before touching other people.					

Appendix C (Continued)

Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
19. Patients don't know the importance of handwashing in the hospital environment.					
20. I think nursing personnel are too busy to remind patients to wash their hands.					
21. Nursing personnel on this unit assist patients relating to their handwashing needs.					
22. Patient handwashing is not a worry of mine.					

II. Each of the next statements addresses handwashing practices. Please check a response to each comment based on the handwashing behaviors that patients demonstrate during hospitalization.

Statement	Always 5	Usually 4	Sometimes 3	Hardly Ever 2	Never 1
Most patients who wash their hands at a sink are observed to: 23. Use running water.					
24. Use soap until it lathers.					
25. Hold hands downward into sink while washing.					
26. Avoid splashing water outside of sink.					
27. Rub hands together for at least 10 seconds.					
28. Wash all surfaces of their hands.					
29. Rinse hands under running water.					
30. Hold hands downward while rinsing.					

Appendix C (Continued)

Statement	Always 5	Usually 4	Sometimes 3	Hardly Ever 2	Never 1
Most patients who wash their hands at a sink are observed to:					
31. Use clean paper towels to dry their hands.					
32. Turn off water faucet with clean paper towel.					
33. Apply lotion to clean hands.					

III. The last statements are based on facts about handwashing in hospitals. Please check TRUE or FALSE to indicate your level of understanding of each comment noted below.

Statement	TRUE 2	FALSE 0
To reduce the risk of nosocomial infections in hospitals, it is important for hospitalized patients to wash their hands:		
34. After going to the toilet.		
35. Before eating or drinking.		
36. Before contact with their wounds, dressings, or drainage tubes.		
37. After contact with their wounds, dressings, or drainage tubes.		
38. After physical contact with supplies and equipment used in patient care delivery.		
39. Hospitalized patients may contribute to their own nosocomial infections by neglecting handwashing.		

Appendix C (Continued)

Statement	TRUE 2	FALSE 0
40. Handwashing is a way that patients can help prevent secondary infections.		
41. Handwashing is the single, most effective means to prevent nosocomial infections.		
42. Effective handwashing protects patients from passing transient microbes to themselves, other patients, visitors, and personnel.		
43. Patient handwashing after toileting helps control fecal-oral transmission of micro-organisms.		
44. This facility's infection control program offers a written policy specific to handwashing practices.		
45. Handwashing by personnel helps prevent the danger of cross-infections in hospitals.		
46. Handwashing by patients helps prevent the danger of cross-infections in hospitals.		

IV. After you have indicated your responses, please mail the entire survey using the preaddressed envelope that is attached to this questionnaire. Please make sure that NO name appears on the survey, so as to ensure confidentiality.

THANK YOU FOR YOUR WILLINGNESS TO CONTRIBUTE TO THIS STUDY!

Appendix D:

Military Medical Technician Job Descriptions

Appendix D

Military Medical Technician Job Descriptions

Differentiation: U.S. Air Force Medical Service Technicians and Medical Service Specialists (U.S. Air Force Regulation, 1982)

Factor	Medical Service Technician	Medical Service Specialist
Duties and Responsibilities	Provides patient care. Performs technical nursing care including preparation and administration of medications, cardiac monitoring, respiratory therapy and teaching of patients and families. Observes, reports and records condition of patient and care rendered. Participates in patient care conferences. Identifies patient problems; assists in the development and evaluation of the patient care plan. Performs phases of physical examinations not requiring judgement of medical officers. Administers unit training programs. Plans, conducts and supervises on-the-job training for all enlisted personnel throughout assignment. Schedules in-service training in new procedures, techniques and equipment. Provides required basic life support training. Conducts or schedules periodic disaster training, fire drills and evacuation procedures. Orients newly assigned enlisted personnel to work area. Supervises performance of subordinates. Makes daily assignments and delegates specific duties. Establishes work methods and standards. Interprets policies and regulations.	Performs medical service functions. Assists professional personnel in meeting patient care needs. Provides for patient comfort. Monitors physiological measurements. Performs portions of medical exams, treatments, diagnostic and therapeutic procedures. Cares for, observes and reports on post-operative patients and seriously ill or critical patients. Prepares and gives medications under the direct supervision of a nurse or physician. Performs selected treatments and reports the results. Assembles, operates and maintains therapeutic equipment. Provides field medical care in disasters. Performs basic life support and triage in emergency situations. Performs care of deceased patients. Orients new patients to the hospital environment. Admits, discharges and transfers patients, as directed. Observes and reports pertinent observations in patient progress notes and in team conferences. Records treatments and procedures rendered and observes effects. Records physiological measurements Assists professional personnel in team conferences. Contributes

Appendix D (Continued)

Differentiation: Medical Service Technician/Specialists (continued)

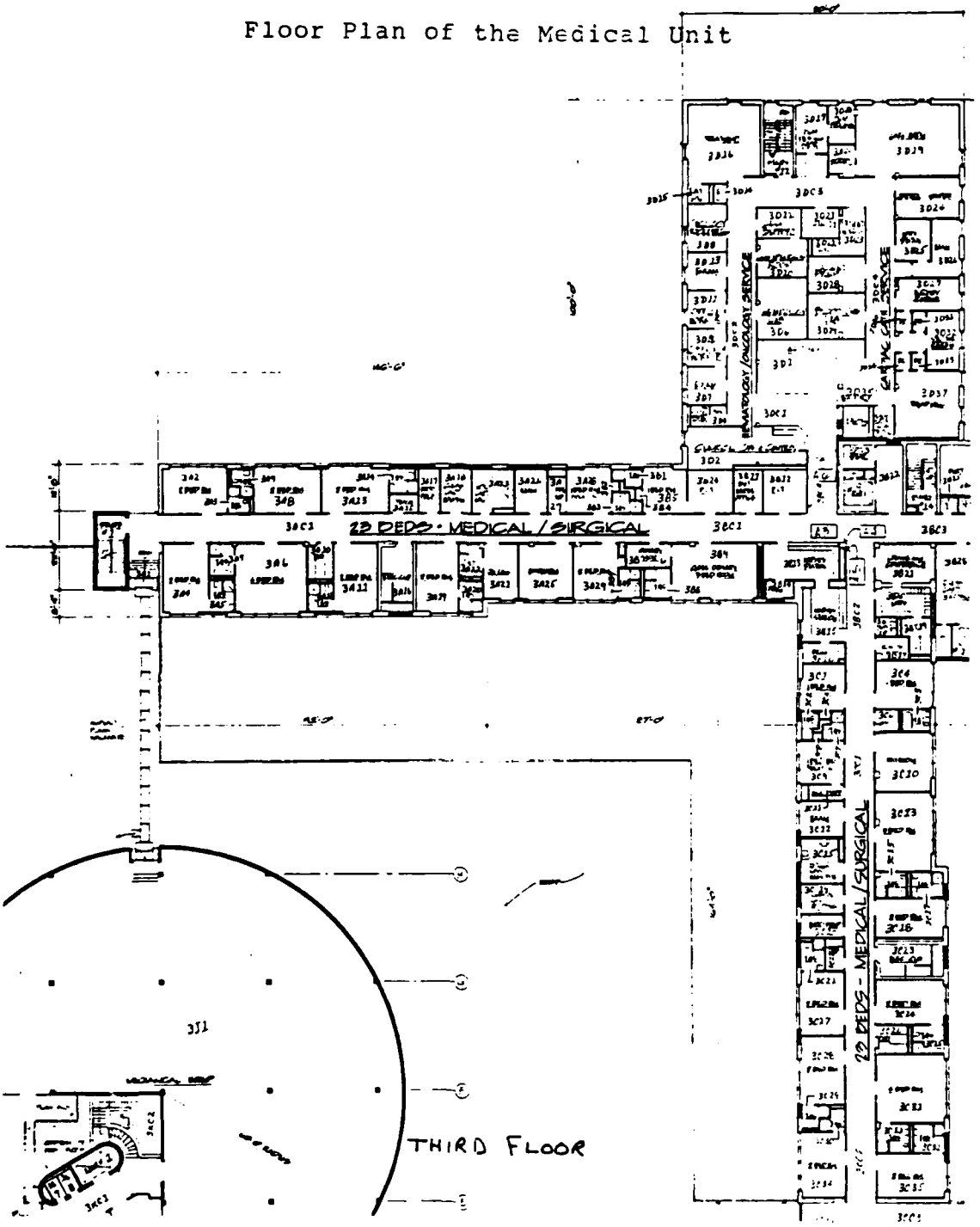
Factor	Medical Service Technician	Medical Service Specialist
	Monitors acquisition, storage and disposition of supplies and equipment. Prepares job descriptions. Inspects activities and procedures to ensure compliance with policies and regulations. Supervises preparation of reports and records. Evaluates performances of subordinate personnel.	to the currency of patient care plans. Maintains linen and supply areas. Obtains, stores and disposes of supplies properly. Maintains medical records from admission through transfer or discharge of patient. Performs initial reception and screening of patients. Assists with medical treatment of patients. Provides emergency first aid measures.
Qualifications and Knowledge	Knowledge of nursing theory and techniques, patient needs, nursing approaches, team nursing, medical terminology, anatomy and physiology, emergency care, drugs and their administration, medical ethics, legal aspects, aseptic techniques, operation and maintenance of therapeutic equipment, personnel unit management, disaster preparedness and chemical warfare, risk management, and management of medical materiel is mandatory.	Knowledge of anatomy and physiology, nursing techniques and procedures, emergency medical treatment to include cardiopulmonary resuscitation, aseptic technique, medical ethics and legal aspects, administration of drugs, operation and maintenance of therapeutic equipment, military hygiene and sanitation, risk management, disaster preparedness and chemical warfare, transportation of sick and wounded, and medical terminology is mandatory.
Education and Training	Completion of a medical service technician course is desirable. Formal basic life support training and proficiency testing is mandatory. Completion of prescribed management course(s) is mandatory.	Completion of a basic medical service specialist course is desirable. Formal basic life support training and proficiency testing is mandatory.

Appendix E:

Floor Plan of the Medical Unit

Appendix E

Floor Plan of the Medical Unit

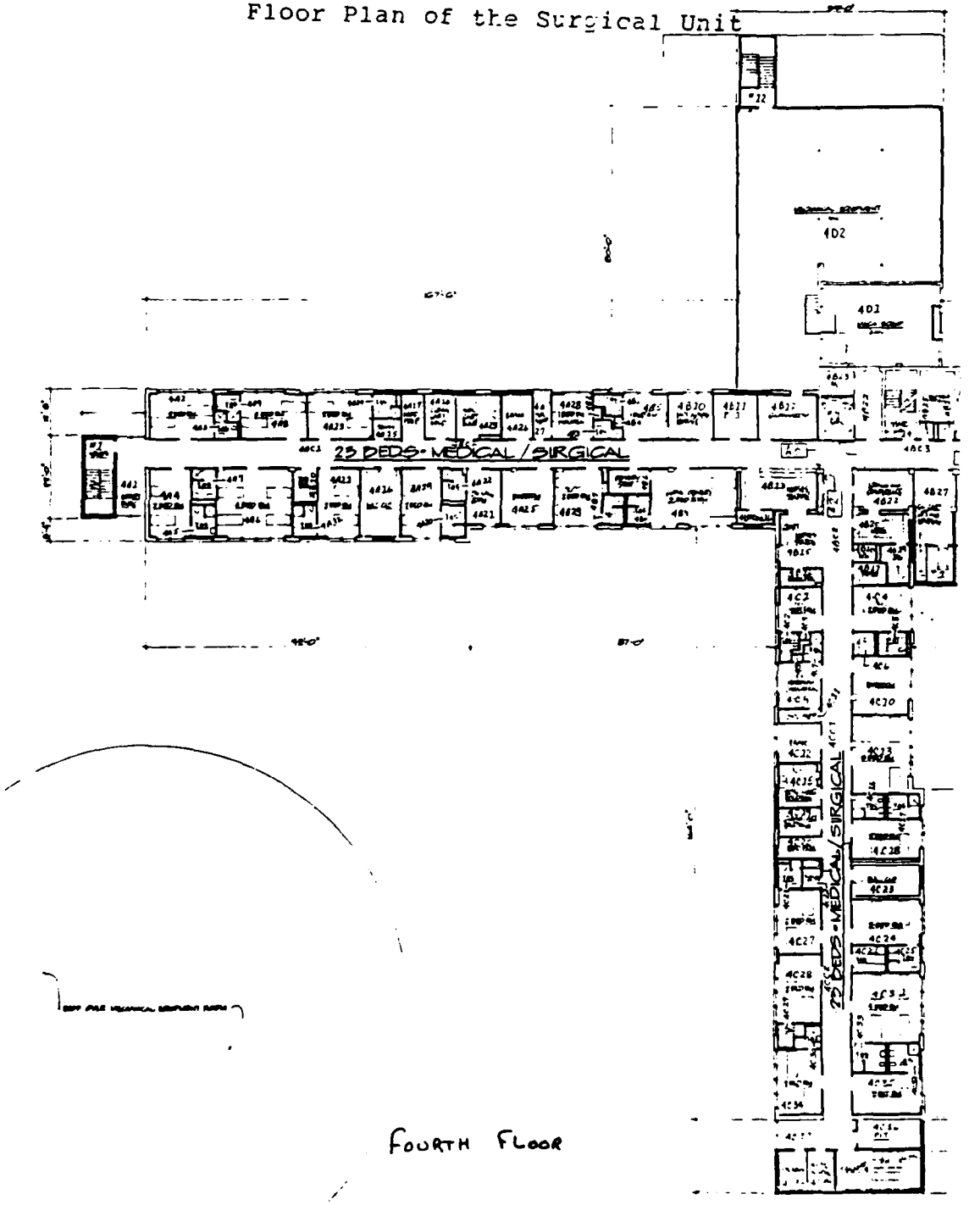


Appendix F:

Floor Plan of the Surgical Unit

Appendix F

Floor Plan of the Surgical Unit



Appendix G:

Patient Handwashing Observation Periods

by Unit, Cell and Time

Appendix G

Patient Handwashing Observation Periods

by Unit, Cell and Time

Observation	Study Unit	Cell	Time Period
1	Medicine	A *	Early morning
2	Medicine	A	Mid-morning
3	Medicine	A	Noon-time
4	Medicine	A	Before bedtime
5	Medicine	B +	Early morning
6	Medicine	B	Mid-morning
7	Medicine	B	Noon-time
8	Medicine	B	Before bedtime
9	Medicine	C ^	Early morning
10	Medicine	C	Mid-morning
11	Medicine	C	Noon-time
12	Medicine	C	Before bedtime
13	Medicine	D #	Early morning
14	Medicine	D	Mid-morning
15	Medicine	D	Noon-time
16	Medicine	D	Before bedtime
17	Surgery	A	Early morning
18	Surgery	A	Mid-morning
19	Surgery	A	Noon-time
20	Surgery	A	Before bedtime
21	Surgery	B	Early morning
22	Surgery	B	Mid-morning
23	Surgery	B	Noon-time
24	Surgery	B	Before bedtime
25	Surgery	C	Early morning
26	Surgery	C	Mid-morning
27	Surgery	C	Noon-time
28	Surgery	C	Before bedtime
29	Surgery	D	Early morning
30	Surgery		Mid-morning
31	Surgery		Noon-time
32	Surgery		Before bedtime

* A = 4 semi-private rooms (8 patient beds).
\+ B = 3 semi-private rooms (6 patient beds).
^ C = 1 private and 2 semi-private rooms (5 patient beds).
\# D = 2 private and 1 semi-private rooms (4 patient beds).

Appendix H:

Indications for Handwashing Practices

Adapted from the Center for Disease Control

Appendix H

Indications for Handwashing Practices

Adapted from the Center for Disease Control

(Garner & Favero, 1986)

1. Post-toileting.
2. Before eating or drinking.
3. Before contact with wounds, dressings or drainage tubes.
4. After contact with wounds, dressings or drainage tubes.
5. After physical contact with other patients.
6. Before contact with particularly susceptible people.
7. After contact with potentially contaminated fomites (supplies and equipment).
8. Before performing invasive procedures (open wound care; central line care; catheter insertion).
9. After smoking.
10. After coughing, sneezing or blowing nose.
11. After combing or brushing hair.

Appendix I:

Approval of the Wright State University Institutional Review Board

Appendix I

Wright State University Institutional Review Board

RESEARCH INVOLVING HUMAN SUBJECTS

Petition No. SC#614

Original review __X__

Continuing review _____

ACTION OF THE SCREENING COMMITTEE

Project Title: "Handwashing Practices Among Hospital Patients: Knowledge and Perceptions of Patients and Nursing Personnel"

Grant or Contract No.: _____

Principal Investigator: Mary Jo Distel, Student
Advisor, Donna Deane, Ph.D.

Department: School of Nursing

The Screening Committee on the Use of Human Subjects in Research has reviewed the Petition with regard to the use of human subjects in this proposed project:

*See Attached __X__ Agree that expedited (Minimal Risk) review is appropriate.

_____ Referred to the IRB for review.

**See Attached

Signed _____ Chair

Date: August 26, 1988

Appendix I (Continued)

SC#614 **Mary Jo Distel, Principal Investigator**
Advisor, Donna Deane, Ph.D.

* Recommended for Expedited Review provided the following condition is met:

a. Receipt of the Consent Form to be signed following data collection. This document will allow the "after-the-fact" use of the observation data. Suggest that the "patient's" cover letter be modified appropriately and used as this document.

** The condition removed upon receipt of a revised Consent Form from Mary Jo Distel noting that she has conformed to the above condition the Board placed on this research study.

Appendix J:

Agency Permission for Conducting Study

Appendix J

Wright State University-Miami Valley
School of Nursing

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE Department of Nursing Research Committee at a midwestern military medical center.
GRANTS TO Mary Jo Distel, RN, BSN

a student enrolled in a program of nurs'ng leading to a Master's degree at Wright State University, the privilege of using its facilities in order to study the following problem:

HANDWASHING PRACTICES AMONG HOSPITAL PATIENTS:
KNOWLEDGE AND PERCEPTIONS OF PATIENTS AND NURSING PERSONNEL

The conditions mutually agreed upon are as follows:

1. The agency (may) (may not) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (may not) be identified in the final report.
3. The agency (wants) (does not want) a conference with the student when the report is completed.
4. The agency is (willing) (unwilling) to allow the completed report to be circulated through interlibrary loan.
5. Other: A copy of the completed report be provided to this agency.

Date: 21 Jul 88

Signature of Agency Personnel

Mary Jo Distel
Signature of Student

Signature of Faculty Member

*Note: This form is filled out after the proposal defense in conjunction with obtainment of human subject approval from the WSU Research Services. Three copies are to be distributed as follows: Original: Student; First Copy: Agency; Second Copy: Thesis Director; Third Copy: School of Nursing, Student Affairs Office.

Appendix K:

Patient Information Letter

Appendix K

Patient Information Letter

Dear Patient:

This nursing study has two purposes: to assess the extent to which you wash your hands, and to assess both patient and employee attitudes about the importance of patient handwashing.

The study will be conducted using surveys and observations. The surveys will measure knowledge and attitudes about the importance of patient handwashing. The nurse researcher will give you instructions and assist you with completion of the patient survey, if needed.

Confidentiality will be maintained throughout the study. All information that is collected will be treated as group data; no individuals will be identified.

Participation in the study is purely voluntary. There will be no risk if you are willing to participate. Your care will not be influenced if you are unwilling to participate. By signing the informed consent, you understand that your responses to the patient survey and your handwashing observations may be used as a part of the aggregate data for the research study.

If you are interested in receiving the results of the study, please send your name and address to the investigator using the stamped postcard attached to the survey form. Please mail the postcard after you are discharged from the hospital so as to maintain your anonymity.

If you have any questions about the study, feel free to contact the researchers at the Wright State University-Miami Valley School of Nursing by calling (513) 873-3134.

Thank you for your time.

Mary Jo Distel

Mary Jo Distel, RN, BSN, Graduate Nursing Student
Principle Investigator

and

Donna Deane, RN, PhD, Research Advisor
Associate Dean for Research and Development

Appendix L:

Employee Information Letter

Appendix L

Employee Information Letter

Dear Division of Nursing Personnel:

This nursing study has two purposes: to assess the extent to which patients wash their hands, and to assess both patient and employee attitudes about the importance of patient handwashing.

The study will be conducted using surveys and patient handwashing observations. The surveys will measure knowledge and attitudes about the importance of patient handwashing. You are asked to fill out the employee survey according to the instructions provided within its contents. Mail the completed survey to the researcher using the envelope provided.

Confidentiality will be maintained throughout the study. All information that is collected will be treated as group data; no individuals will be identified by name.

Participation in the study is purely voluntary. There will be no risk or inconvenience to you if you are willing to participate, other than the amount of time required to fill out the survey. Also, you may withdraw from the study at any time, without consequences, by just not returning the survey.

Completion of the employee survey will indicate your willingness to be a participant in this nursing research study. If you have any questions about the study, feel free to contact the researchers at the Wright State University-Miami Valley School of Nursing by calling (513) 873-3134.

Upon completion of the study, an abbreviated summary will be provided to in-patient charge nurses so that a report of the research findings can be posted for personnel feedback. Also, a copy of the detailed study report will be maintained by the Department of Nursing Research Committee.

Thank you for your time.

Mary Jo Distel

Mary Jo Distel, RN, BSN, Graduate Nursing Student
Principle Investigator

and

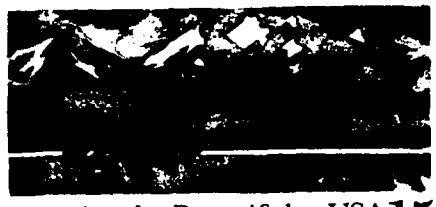
Donna Deane, RN, PhD, Research Advisor
Associate Dean for Research and Development

Appendix M:

Request for Summary of Findings

Appendix M

Request for Summary of Findings



Wright State University
School of Nursing
c/o Mary Jo Distel RN, BSN
Dayton, OH 45401-9950

Please send a report summary of the nursing research study titled "Handwashing Practices Among Hospital Patients: Knowledge and Perceptions of Patients and Nursing Personnel" to:

NAME_____

ADDRESS_____

_____

(Mail this postcard after you are discharged from the hospital. Thanks for your input!)

Appendix N:

Patient Informed Consent Form

Appendix N

Patient Informed Consent Form
"Handwashing Practices Among Hospital Patients: Knowledge and Perceptions of Patients and Nursing Personnel"

Informed Consent

This nursing study has two purposes: to assess the extent to which you wash your hands, and to assess both patient and employee attitudes about the importance of patient handwashing.

The study will be conducted using surveys and observations. The surveys will measure knowledge and attitudes about the importance of patient handwashing. The nurse researcher will give you instructions and assist you with completion of the patient survey, if needed.

Confidentiality will be maintained throughout the study. All information that is collected will be treated as group data; no individuals will be identified.

Participation in the study is purely voluntary. There will be no risk if you are willing to participate. Your care will not be influenced if you are unwilling to participate. By signing the informed consent, you understand that your responses to the patient survey and your handwashing observations may be used as a part of the aggregate data for the research study.

If you are interested in receiving the results of the study, please send your name and address to the investigator using the stamped postcard attached to the survey form. Please mail the postcard after you are discharged from the hospital so as to maintain your anonymity.

If you have any questions about the study, feel free to contact the researchers at the Wright State University-Miami Valley School of Nursing by calling (513) 873-3134.

Thank you for your time.

I understand by signing this informed consent that my responses to the patient survey and the observations of my handwashing behavior may be used as a part of the aggregate data for the research study named above.

_____ _____

(Patient's Signature) (Date)

Appendix O:

Educational Literature on Handwashing

Educational Literature on Handwashing

HOW TO WASH YOUR HANDS

(and look like you know what you're doing)

THINK (the only really difficult part)

DIRTY

- Hands before washing.
- Handles — faucet, soap dispenser, towel dispenser.
- Sink.
- Bar soap (on outside).
- Waste container lid.
- Door knob.

CLEAN

- Water
- Liquid soap
- Inside of bar soap.
- Paper towels.
- Hands after washing (hopefully).

Let Your Fingers Do the Washing

There's always time

to WASH

CLEAN UP AMERICA

PLAN AHEAD:

- Not to recontaminate hands before you even get out of the washroom — handles, doorknobs.
- To be able to wash well. Excess jewelry? Too long sleeves?

LETS DO IT!

- Turn on water and adjust temperature.
- Dispense soap (If bar soap, wash off soap, same procedure. Just do it twice)
- Wash thoroughly and with vigor at least 10 seconds. Jewelry? Nails? Sleeves?
- Dry hands with paper towel.
- Now turn off water with towel.
- Dispose of towel without touching waste container.
- Use hand lotion — prevent chapping. Germs love to hide in chapped skin.

WHEN TO WASH

- Hands look dirty.
- Hands feel dirty.
- After contamination — known or possible — by body secretions or excretions:
  - Urine or stool — touching toilet or paper.
  - Mucus or saliva — covering sneeze or cough, blowing nose.
- Before eating or handling food.
- When caring for sick people.

REVIEW OF HANDWASHING ESSENTIALS

THINK WATER SOAP [illegible] DRY THINK

SMILE

IF YOU'RE CLEAN

HST-LA

"Handwashing is the single most important means of preventing the spread of infection". Official statement of U.S. Government, Centers for Disease Control.

Brevis Corporation 3310 South 2700 East • Salt Lake City, Utah 84109 • (801) 466-6677

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